

PERSONAL COMPUTING

**Draw Your
Own Graphics**

**The "Real"
Education Crisis**

**Word Processing
Roundup**

**Hands Off!
A Look At
Data
Security**



Report Manager™ and the PC-8000 Personal Computer: An unprecedented three dimensions of management information.

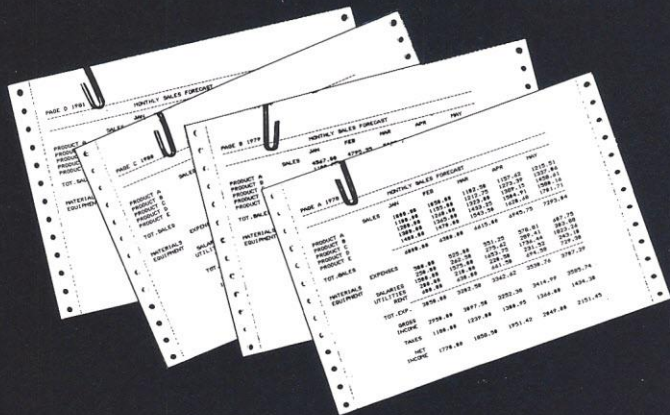


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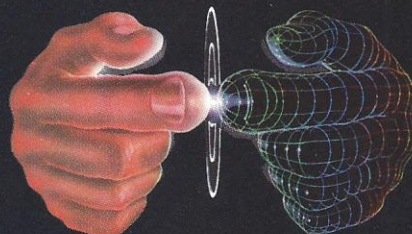
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Sample printout showing use of X, Y, and Z axes.
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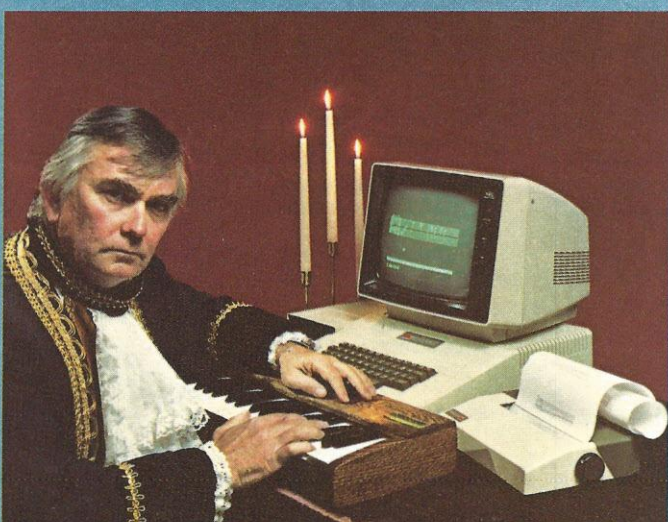
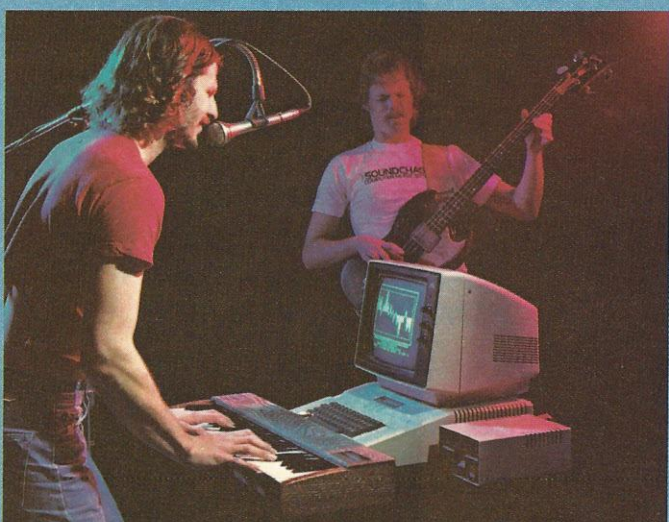
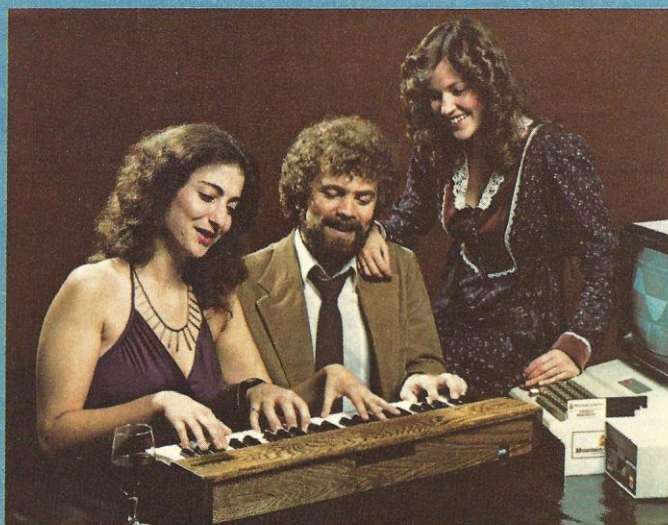


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PERSONAL COMPUTING

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Data security takes center stage as
a hot issue in personal computing.

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With users becoming aware of how much their data is worth—or could be to others—software safeguards are becoming more and more important.

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By James E. House

Personal computers are providing behind-the-scenes muscle in scientific research ranging from genetic engineering to monitoring Mount St. Helens.

82 SPECIAL REPORT **WORD PROCESSING FOR PERSONAL COMPUTERS**

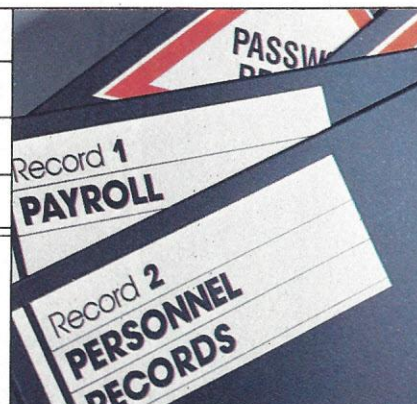
By David Gabel

Word processing is one of the most popular applications in personal computing. It can make your life easier if your main task is text manipulation, not number crunching.

112 PROFESSIONAL/MANAGERIAL **MANAGERS COMPUTERIZE TO ORGANIZE WITH DBM**

By Edgar Coudal

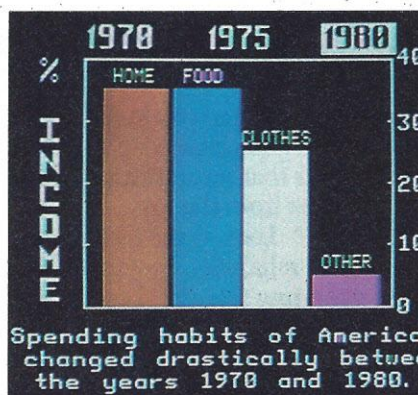
Once the preserve of mainframes, data-base management through personal computers is enabling managers to monitor their own information right at their fingertips.



COVER



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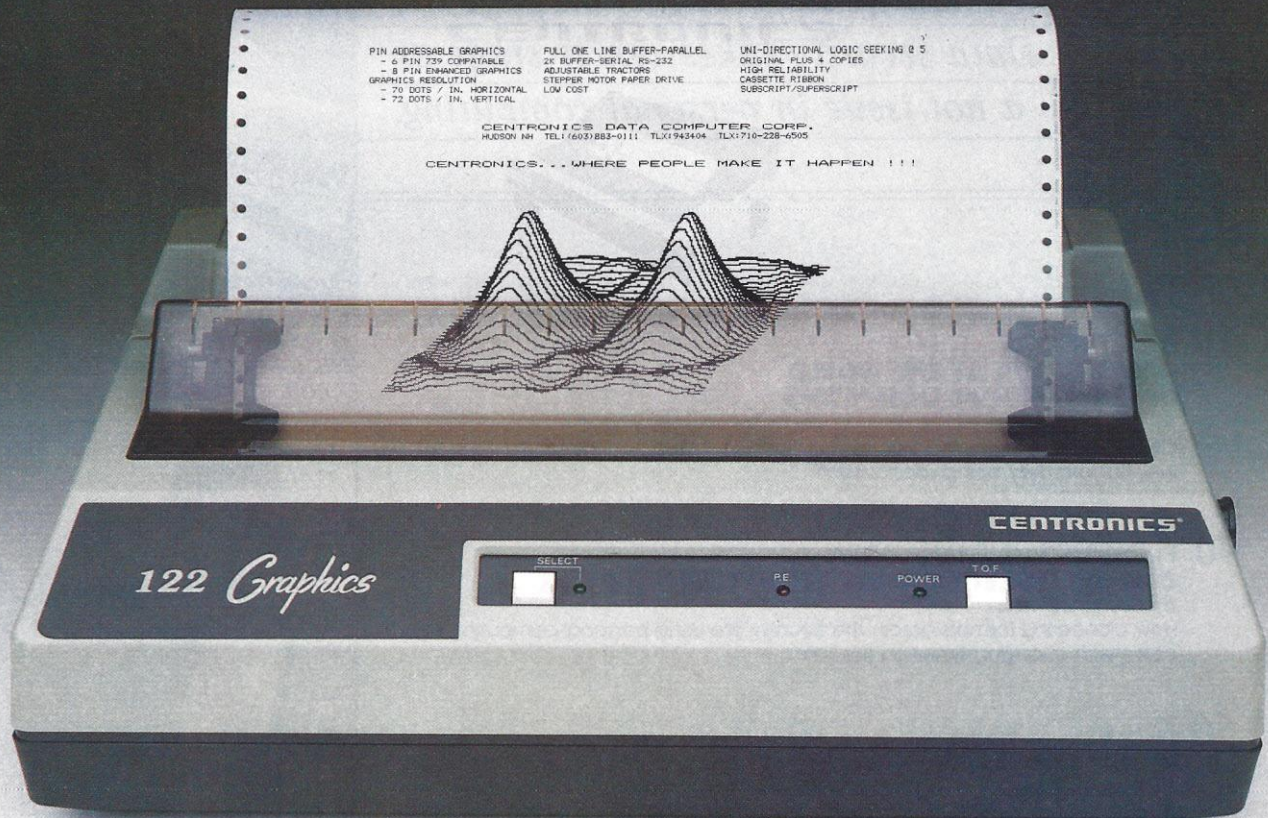


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THE NEW CENTRONICS 122 GRAPHICS PRINTER.



BUILT RUGGED YET AFFORDABLE. BECAUSE YOUR COMPUTER SHOULDN'T BE PLAYING WITH "TOYS."

When you look for a printer, take a good close look at the critical points that separate a professional printer from the toys.

Look at the factors that add up to reliability. Look at the built-in operating features. Look at the service. *Then*, check the price.

We did. Then we built the "122 Graphics." That's why we'll stack it up against any desk-top printer. Especially the toys.

IT'S PRICED FOR VALUE

The "122 Graphics" is truly a commercial grade printer, but its price is comparable to the top-of-the-line toys. You see, even most of the toy printers lose their price advantage when you add the options that are standard on the "122 Graphics."

IT'S BUILT TOUGHER

The "122 Graphics" uses the same technology as the work-horse printers that have made Centronics the top choice among OEM's in brand preference studies. And, it provides the high reliability and low cost of ownership required by the professionals.



IT DOES MORE

If you want features, built-in, not added on, use the "122 Graphics" for comparison:

- 132 Column Paper Width
- Adjustable Tractor Width
- Forms Handling—up to 5 parts
- Graphics—Business and Image Graphics 6- and 8-Pin Switch Selectable
- Large Library of "Off-the-Shelf" Software
- High Throughput—120 CPS Bi-Directional Operation.

WITH BETTER SERVICE

Centronics has the largest network of factory service and walk-

in service centers in the printer industry. Not third-party service—**FACTORY SERVICE!** Worldwide. Ask the competition about service.

What's your computer? IBM? Apple? TRS-80? Xerox? Atari? It doesn't matter, the "122 Graphics" has the software flexibility to interface with virtually every one of them and many others.

And finally, consider this. The "122 Graphics" is from Centronics. The company that has built and sold nearly half a million printers to businesses and OEM's of every size worldwide.

See your nearby authorized Centronics Dealer or Distributor soon and see first hand why the toys are no match for the Centronics "122 Graphics" printer.

CENTRONICS[®] PRINTERS

Centronics Data Computer Corp.
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Tel. 603-883-0111

Words, Words, Words

Words are so important in society today. We know almost all that we know through words—written, spoken or thought. If it were not for words, it's fair to say, there probably would be no society at all.

That's why the special report in this month's issue is so important. We have all heard that we are on the verge of a new information revolution, if indeed we aren't there already. And one of the chief components of that revolution is the capability to process words, a capability that is now being delivered to individuals like you and me through the personal computer. If the pen is mightier than the sword, as the old saying goes, how much more powerful is the personal computer equipped with a word-processing system.

Word processing is a funny kind of a term. To me, it has always conjured up a vision of letters being pressed into a contraption something like a food processor that mangles, attaches, unattaches and finally shapes them into words that then go onto the printed page.

There are other images, though.

One can think of people who process words for less than nice reasons. Isn't it word processing, of a sort, when words are used to conceal the truth? When propaganda is used to lull the populace into accepting policies that otherwise the public would probably reject?

Isn't it word processing that goes on in totalitarian nations, where the press is controlled so that the only opinions expressed are those favorable to government? Isn't it word processing in those states where people are even told what they can think, where they can go, etc.?

Certainly, that's not the word processing that people in personal computing like to think of. The word processing that we know is a real help

to those of us who use it. It makes our lives easier, not tougher. It gives us more freedom, not less, just as the ability to process data with a personal computer gives everyone more freedom.

But before people get to exercise this freedom, they have to know how to use words in the first place. It seems pretty clear that word processing has a place in the school. But if it is to fulfill its potential, there must be enough computers that students can at least get to use them. Our education story this month wonders whether that is even a remote possibility. And if it's not, what is to become of our children, who, we are told, must be familiar with computers if they're to be successful in life in the next two decades?

Some of the things you'll be doing with your personal computer, in the near future if not today, will come into your home through some kind of a videotex system. Videotex is a development that's sure to impact your life. Soon many commercial institutions will be offering services over videotex that will make your life simpler. If you have a personal computer, your benefit from these systems will more than double, since you'll have all the capabilities of your computer plus those that others will be giving you. So you need to know what videotex is, and what it can and can't do for you.

With videotex, we'll be letting large institutions into the house. And those institutions will have more than Ma Bell's voice-only capability. They'll have access to video screens in the home. If two-way data communications are a reality now and in the near future, can two-way visual communications be far behind? The possibilities of two-way visual communications are mind-boggling and frightening, as our essay points out.

And there's more. Not only will these institutions be able to see into your home, they'll have access to all the information that goes in and out of it, whether you really want that or not. And if your bank or the local shopping mall can get to all those records, can government be far behind those institutions? It makes the problems of data security we talk about in our cover story pale by comparison.

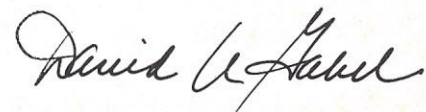
This isn't the first time that technology and its implications have seemed to impact questions of public policy. The auto, for example, caused such an uproar in society that state, local and even federal bureaucracies had to be instituted to deal with it. And some might argue that even further bureaucracy is needed, to make automobiles safer, for example.

And the public has had a say in the management of radio and television, through the establishment of the Federal Communications Commission, and on the activities of the aviation industry, with the FAA.

The precedent has been set. The question now before the public, as far as we are concerned, is what should be the interaction of the personal computer and public policy. The privacy question we've discussed here is one aspect of the broader problem.

We'll be looking at the question from time to time in *Personal Computing*. Next month, for example, we plan to take a hard look at computers in education, to try to let you know just what you're getting for the tax dollars your school has invested in personal computers. Or what you should be getting, if you're not.

It should make for interesting reading.





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The \$1795 suggested retail price for the Osborne 1 (a registered trademark of Osborne Computer Corporation) includes a full business keyboard, built-in CRT display, two built-in floppy disk drives, CPU and 64 kilobytes of RAM memory, RS-232 and IEEE 488 interfaces, and the following software packages: WORDSTAR® word processing with MAILMERGE® (a trademark and a registered trademark of MicroPro International Corporation of San Rafael, California); SUPERCALC® electronic spreadsheet system (a trademark of Sorcim Corporation); CBASIC® (a registered trademark of Compiler Systems); MBASIC® (a registered trademark of Microsoft); and CP/M® (a registered trademark of Digital Research).

LETTERS

NAVIGATING THE HIGH SEAS

I read with interest your article "Seaworthy Computers Make for Smooth Sailing" on page 46 of the April issue, toward the end of which you discuss my own experiences, as given in my book *Airborne*.

I have the highest admiration for Ken Newcomer, but it is absolutely incorrect that I misplotted the readings taken from the machine, which, after all, worked splendidly for the first half of the trip. It is not likely that I would have forgotten how to make those plottings over the last half. Several months after my return, when I sent the machine to the West Coast to be looked at, I was told that some particle or other got in the way of the readings, and that this accounted for the anomalies.

I have a fresh section on the HP 41-C in my upcoming book *Atlantic High*, which perhaps you will want to look at. It is a machine far superior to the HP 35 in terms of its usefulness to navigators.

Wm. F. Buckley, Jr.
EDITOR
NATIONAL REVIEW

VOLCANIC ACTION IN EDUCATION

We were very sorry to have missed being listed in your education article "Educational Software for the Home" on page 48 of the June issue.

Our program, Volcanoes, offers a new and exciting approach to teaching earth science from junior high school up through the first two years of college. The only other program I know of that compares with it is Three Mile Island by Muse Software.

Donna J. Goles
EARTHWARE COMPUTER SERVICES
EUGENE, OR

"Hayden's *Personal Computing* magazine's accuracy policy: to make diligent efforts to insure the accuracy of editorial material. To publish prompt corrections whenever inaccuracies are brought to our attention. Corrections appear in 'Letters.' To encourage our readers as responsible members of our business community to report to us misleading or fraudulent advertising. To refuse any advertisement deemed to be misleading or fraudulent."

DIAL UP AND LOG ON

Your recent article "Coming On-Line with the World" (April 1982, page 36) was, for the most part, a well written introduction to the world of telecomputing. However, there were several misleading statements in the text.

The author refers to "the big three utilities," for example, as Dow Jones, The Source and CompuServe. While these are indeed well established services, the omission of Dialog Information Services Inc. detracts significantly from the value of the article.

Dialog is the largest vendor of on-line services. We offer more than 150 data bases that contain over 60 million references and abstracts, covering virtually every topic from advertising to zoology. In addition, we have been in commercial operation since 1972, long before the services mentioned in the article.

Furthermore, we are not unknown to personal-computer users. We have been present at personal-computer trade shows, and we include a significant number of personal-computer users among our customers.

Indeed, as a free-lance business writer, David James might well find Dialog more useful than the three services mentioned, as the depth and breadth of our data bases are greater.

In the matter of initiation fees, Dialog offers a more attractive arrangement than the "one-time membership fee, usually in the neighborhood of \$100" mentioned in the article. We have no initiation fee or monthly minimums. In fact, all first-time user accounts receive up to \$100 of free connect time during the first month of service.

If I can provide any additional assistance, please don't hesitate to call or write.

Betty A. Davis
DIRECTOR, DIALOG MARKETING
DIALOG INFORMATION SERVICES, INC.
3460 HILLVIEW AVE.
PALO ALTO, CA 94304

PERSONALIZED PORTFOLIO PUNDITS

Thank you for the article "Planning Your Portfolio Personally" on page 62 of the May 1982 issue.

Unfortunately, there is one problem with the article. People who have called me say that they do not understand why so much description and pricing, etc. was

available on the other software, but they had to make a special effort to seek me out.

In addition, there is now a fourth module (you only mentioned three) in our portfolio-management system for the Apple. Called Portcom, the module automatically logs on to the Dow Jones News Retrieval Service, retrieves and stores quotes and updates portfolio files. A modem and a Dow Jones password are required.

Using this fourth module, any number of lists of up to 200 securities may be created and maintained, including mixtures of stocks, bonds, options, mutual funds and U.S. Notes/Bonds. All quote information from Dow Jones may be saved, displayed on the monitor and printed in report form. The Portcom module may also be used to process the portfolio data files created and maintained by the Portrac record-keeping module.

Roger B. Orenstein
PORTWARE
EDINA, MN

Thank you for including a description of the Smart system in your article "Planning Your Portfolio Personally" (May 1982, page 62).

We feel that the article is excellent and presents our product favorably.

Linda Millman
SOFTWARE RESOURCES, INC.

OVERLOADING THE AIRWAVES

I must take violent exception to your June editorial where you say: "Remember, government responded when it found that personal computers are potential sources of electronic noise." Do you believe that computers should be allowed to produce unbridled interference to radio and TV? Perhaps even to interfere with your father's (or your own) pacemaker?

It is bad enough that irresponsibility and cost cutting have resulted in millions of electronic entertainment devices that are unable to reject Radio Frequency Interference (RFI) that is not within the portion of the spectrum the device is intended to receive. It is still worse to allow the manufacture and sale of "noise generators" that can render the best quality receivers unlistenable, because these noise generators are radiating directly at the frequencies of interest to those using the receivers.

For years amateur radio operators have

LETTERS

been combating the problems of inadequately built consumer devices that respond falsely because of their design. The consumer can't accept that his \$1000 hi-fi is at fault—the \$2000 "Ham" station must be.

Some of the same logic is apparent in your statement. If your system radiates 3.5 MHz of noise, it can easily receive it. When the Ham operator next door keys his 80 meter (3.5 MHz) transmitter and your system goes nuts, who's to blame? He is operating legally under license. Your computer (even if it cost \$5000) functions as a receiver and just can't reject foreign signals. The quality of construction and design required to prevent RF leakage is exceedingly helpful in preventing incoming RF interference.

It all breaks down to the old saw: "It depends on whose ox is gored." All this machinery can operate together in the radio frequency spectrum if people take responsible attitudes and design the machines accordingly. But this is impossible if each user segment takes the attitude that all the fault is someone else's. It requires cooperation.

Francis LeBaron
PRESIDENT
E. L. LEBARON FOUNDRY CO.
BROCKTON, MA

ON DOCUMENTATION AND ANSWERS

The article "Deliver Yourself from Documentation Devils" on page 85 of the June 1982 issue had some very sound advice for programmers, and I commend both you and Henry Lefevre for the article. However, your typesetting staff did Mr. Lefevre a large injustice. One of his examples of good programming style was:

```
5010 IF YR 80 OR YR 82 THEN GO  
TO 5000
```

It should have read:

```
5010 IF YR < 80 OR YR > 82 THEN  
GO TO 5000
```

It was a small oversight, but it makes a large difference.

In addition, I believe you failed to answer the question in the "Answers" column in the same issue on whether or not to buy a personal computer with one or two drives. Your answer addressed the absolute necessity of one or two drives, but I feel that it was an obvious answer. It didn't address the question: "Why should I spend the extra money for two drives if I only need one?"

As a person operating a personal computer with only one drive (a temporary condition) for the past few months, I feel that doing any reasonable amount of work on a single drive system is extremely insecure, since backing up files is tedious, at best. Backup copies of files can be made on the same diskette, but that is not very safe and reduces the overall storage capability. With CP/M, I use DDT and SAVE to transfer one file to another diskette, which is a very time-consuming process, especially since there are several program and data files in any operation worthy of automating.

For someone who wants a personal computer to play games and have fun with, your answer was sufficient. For someone who wants to do more, he needs to look at the added cost as insurance and decide how much his time and data are worth.

Joseph Gersztyn
COVILL ASSOCIATES INC.
SAN DIEGO, CA

RELIEF FROM TOILSOME TERMINOLOGY

I was just on the verge of writing to you until I picked up the April 1982 issue of *Personal Computing*. I was going to ask you to devote an issue of your magazine to explaining the ins and outs of computing terminology and technical jargon. Learning about computers for their possible future application in our business was the main reason I subscribed to the magazine in the first place.

After reading the editorial, however, I noted that you have now devoted an issue to this problem and are trying to bring us novices up-to-date on terminology. I was very glad to see this, as I haven't been able to really get a grasp of what's been going on in some of the articles that appeared in previous issues. I'm somewhat relieved that I can now predict that I will know what everyone is talking about in future issues.

But there is one last point I'd like to make: I was ready to knuckle down in the "Answers" column, but I was a bit disappointed to see that it was rather short.

Michael P. Thomas
SPRINGFIELD, IL

TWO EXCEPTIONS TO THE HIGH- PRICED LETTER-QUALITY RULE

On page 10 in the "Answers" column in the July 1982 issue, you compare the

prices of letter-quality and dot-matrix printers. You also mention that the Smith-Corona is the inexpensive exception in the typically high-priced letter-quality category.

There is now another possibility. You take the Olivetti Praxis 35 (about \$600 in Switzerland), install an IC SN 74156, and write a program with about 100 (HEX) bytes in machine code and you have a letter-quality printer. It's not very fast, but otherwise it's excellent, and, when it's disconnected from the computer, you have an elegant portable.

The computer I use is the Exidy-Sorcerer.

Karl Huni
SWITZERLAND

IS THERE A DOCTOR IN THE PROGRAMMING POOL?

I am presently preparing a book on the use of personal-computer programs in medicine. The programs will include file organization of medical records, data extraction, file and general statistics used in medical research, graphic plotting of research data, patient history taking and history summarization, patient scheduling and billing routines.

I plan to publish programs for the Apple II, the Commodore PET and the TRS-80 Microcomputer, and I would be interested in hearing from any of your readers involved in medical applications.

Derek Enlander, M.D.
DEPT. OF NUCLEAR MEDICINE
NEW YORK UNIVERSITY MEDICAL CENTER
560 FIRST AVE.
NEW YORK, NY 10016

ADDENDUM

The listing of printer manufacturers in the July Special Report, "If It's Worth Its Weight in Paper," failed to mention NEC Home Electronics, located at 1401 Estes Ave., Elk Grove Village, IL 60007.

CORRECTION

Reader Gary Oppenheimer called in to point out that the address we listed under his letter in the June issue (Letters, page 8) is incorrect. Gary is based in New York City.

Verbatim Datalife™ flexible disks now come in a bold, new storage box. But more important, they now come to you with a five year warranty.*

We can give you a warranty this long because we're confident the way we make Datalife disks will make them perform better, last even longer.

All of our Datalife disks feature seven data-shielding advances for greater disk durability, longer data life. To protect your data from head-to-disk abrasion. To shield your data against loss due to environmental conditions. To insure a longer lifetime of trouble-free data

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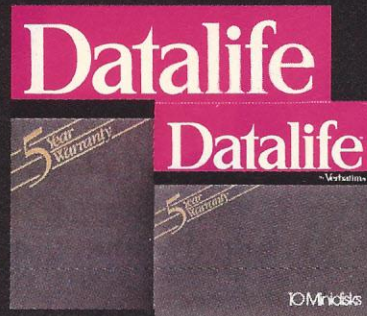
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Make A Bold Statement With Your Computer Printout

In this new monthly column, "Answers," we will respond to your most frequently asked general questions about personal computing. Please send your questions to: Answers, Personal Computing, 50 Essex St., Rochelle Park, NJ 07662.

Q. How do I make word-processing programs tell dot-matrix printers to do special typefaces? I'm tired of the lightweight, stippled look of ordinary printing. I'm especially interested in producing characters that are as close to letter-quality as possible.

A. Special typefaces can be set up both inside and outside of word-processing programs. We'll start with the latter, since this set up should work with virtually any word-processing program or computer you may have.

If you have an Epson MX-80 printer, for example, it's equipped with something called emphasized mode. This mode is about twice as dark as the normal mode (and about twice as slow to print). Furthermore, the extra dots that make the copy darker are printed just offset from the basic copy outline. This makes the letters smoother and more legible.

This emphasized mode can be directly engaged by firing up your computer without your word-processing program. If you have an Apple II, you then type PRINT CHR\$(27) CHR\$(69). On a TRS-80 Microcomputer Model III, you'd type LPRINT CHR\$(27) "E". In either case, type in the phrases with the printer on, and then boot your word-processing program. When you engage your word processor, you'll find that it will print in emphasized mode thereafter, as long as the computer and printer stay on. To return

to normal mode, simply turn the printer off and on again.

The code "CHR\$" notifies your system that the series of numbers that follow it will be an ASCII (American Standard Code for Information Interchange) code, which corresponds to various letters and commands. Most computers recognize ASCII codes, though they may interpret them differently. The same is true for printers. And the same codes can be used to turn off whatever print style you're using, and engage another one of your choice.

The Epson printer has four main modes (competitive printers have a variety of modes, too) that make various printing combinations possible. Its other modes and codes include: double width (14), compressed (15) and double strike (71). The escape code (27) precedes emphasized and double-strike modes. Compressed is especially useful because it lets you print 132-column data on normal 80-column paper. Double strike achieves an effect similar to emphasized, although its printed characters are less attractive (and printing is slower). Emphasized combined with double strike is so black it looks as if it was burned through the page.

More sophisticated word-processing programs allow you to access these codes from within the program. For instance, in Hayden's Pie Writer, you can imbed the commands into the text you create, so whenever you print that particular file, the computer will tell the printer which mode or combination or sequence you want.

Either way you do it, you owe it to yourself to find out how these features work. The details on employing these printing capabilities may be found in your printer manual and in your word-processing manual.

(For more on word processing, see our Special Report, "Word Processing for Personal Computers" on page 83 in this issue.)

Q. If I buy a Winchester disk drive, can I eliminate floppy disk drives altogether?

A. No. You still need at least one floppy drive to install new software, to make backups and to make sure you can still use the computer if and when the hard drive malfunctions, assuming your floppy drive is not built in.

One computer that does not require a floppy drive for these functions is the Onyx Sundance, which uses a cartridge tape instead of a floppy disk. Here you are dependent on the manufacturer for reformatting software from disk to tape. Other makers such as Corvus provide a cartridge tape backup as an option, but you still need the floppy drive to install software.

Q. I'm having trouble getting the hang of CP/M. The commands are numerous and cryptic. Is there some way around this?

A. There are two ways around it. First, there are several interactive tutorials on disk to help you learn how to use it. The best known examples are Teach/M from Select Information Systems in Kentfield, Calif., and ATI-Power for CP/M from American Training International in Manhattan Beach, Calif.

Second, there are several programs designed to wrap around CP/M and translate all those cryptic commands into plain English. The best known of these are CP+ from Taurus Software in San Francisco, Calif., and Supervyz from Epic Computer Corporation in San Diego, Calif.

ANSWERS

The makers of the training programs feel that their way gives the user more flexibility—he can use any CP/M system anywhere, and use revisions of CP/M without installing the “wraparound” programs. The makers of the latter feel that you can have the dealer install their software onto your CP/M system and start using it right away without special training. Also, if you don’t use CP/M for a while, you won’t need to brush up on it with wraparound programs.

Both of these programs work, and there are others coming that will do either of these things, too. But each has a distinctive style that may or may not match your own. The Select system, for instance, is very thorough and ultra-friendly in its style of interaction. The ATI system leans more toward a factual approach, giving you just what you need to run the system. Neither is inherently superior to the other—they simply use different styles.

(For more on CP/M and other operating systems, see “Operating Systems under the Microscope” on page 97 of our July 1982 issue.)

Q ■ I want a computer primarily for word processing. I was going to get a Wangwriter, but I’ve heard there are less expensive computers that can do the job. What do you recommend?

A ■ Right now, there appear to be a few if any “bargains” in computing. That is, for a given level of capability, reliability, versatility, expandability, ergonomic qualities and general friendliness, you have to pay a certain amount of money. Some computers—mainly older designs sold to limited markets—cost a lot more than most of their competition. But these usually have survived because they can be had with specialized software that does a particular job that few, if any, other machines can do. But you probably can’t duplicate the Wangwriter’s special set of qualities for less money, though you

could find a number of computers in the same price bracket that would be very competitive.

You can get a personal computer, for instance, with a letter-quality printer and word-processing software that would work pretty well for somewhere between \$4000 and \$5000. Some well known computers that fit this bill include the Apple II and III, the IBM Personal Computer, the NEC PC8001, the TRS-80 Microcomputer Model II, the Televideo TS-802 and the Xerox 820. New machines in that price range include ones from Cromemco, DEC, Franklin, Hewlett-Packard, Olivetti, Sanyo and Toshiba, among others.

What puts all these systems in that price bracket are the new daisywheel printers, which can cost anywhere from \$900 to \$1500, for a total system price of a bit over \$5000.

Between these computers and the Wangwriter you’ll find systems like the Victor and the new Vector 4, and also a raft of S-100 machines. These S-100 machines generally come as boxes to which you add a terminal and a printer.

If there is a price leader, it’s the MRC-1000 from Sanyo. This system has a suggested retail price of about \$2000, plus printer and word-processing software. That would make a system total of about \$3400 to \$4000. That seems to be the least expensive system, although it only comes with one disk drive—but then, so does the Wangwriter you mentioned. The two-drive Wangwriter costs around \$7500.

Thus far we’ve just discussed the hardware. Word-processing software is legion, and is usually specific to the computer’s operating system. Most word-processing packages are made by independent firms, but some computer makers either sell their own software, or sell someone else’s under their own name. These range from terrific to terrible.


In addition to software, there are other features of personal computers

you should consider if you plan to do a lot of word processing. Detachable CRTs, for example, make sense for word processing because they give you more positioning flexibility for those long stints at the keyboard. The full-width column allows you to see more of what you just wrote than the half-width (or less) found on many of the less-expensive personal computers. The Apple II with its 40-character-width screen still qualifies for our list here because half a dozen makers make 80-column hardware add-on accessories for it that give you an 80-column width. And a full-size CRT (12-inch standard) appears to be the best choice for easy viewing.

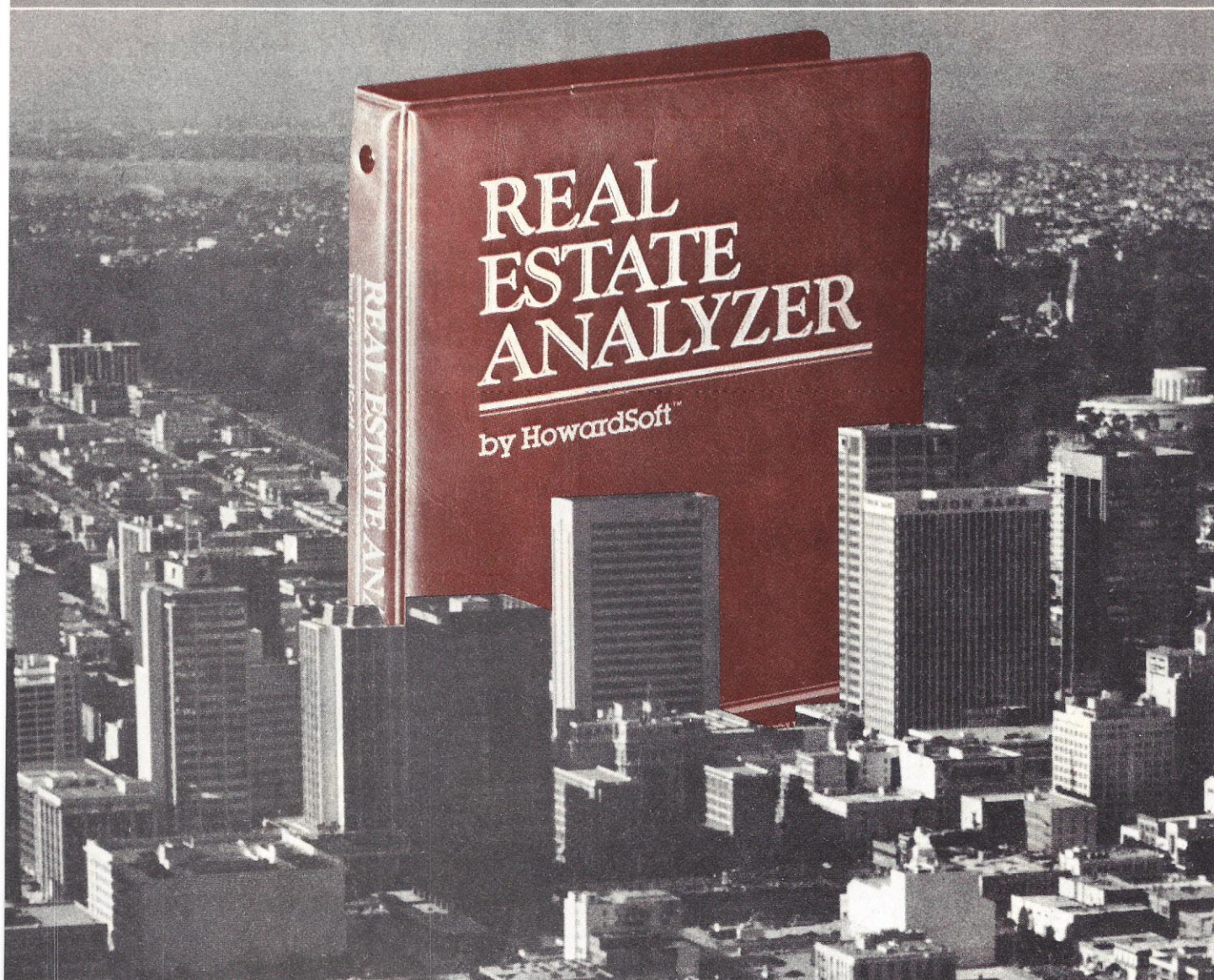
However, if you are willing to use a full-size monitor that runs only a 52-column-width display, you could get an Osborne system and a \$900 printer for under \$3000—you just add the monitor and disregard the built-in one. And if you looked at the amazingly sharp, small screen on the Otrona, you’d find a compact, full-capability system in the \$5600 or so bracket.

So out of all these options, you should cut the list down to the ones your local dealers sell, are familiar with and service. Then look around for word-processing software. Also see what software your local dealers can actually demonstrate for you, or let you play with if their salesmen aren’t familiar with the ones that interest you.

Q ■ I have a Redactron magnetic card typewriter that I want to use as a letter-quality printer. Isn’t there something I can clamp to my keyboard that will do that?

A ■ You might be able to find one somewhere, but how would you get it serviced? Rochester Data in Rochester, N.Y., used to make such a device, but it cost \$800, barely \$100 less than some letter-quality printers currently on the market, and the company, sad to say, is now out of business. 

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VIDEOTEX VIA THE PERSONAL COMPUTER: THE BEST ALTERNATIVE

by Mike Barlow

Videotex is on the horizon. But there's one inescapable conclusion we can draw now about videotex systems. More and more people are using personal computers for videotex, and are finding that these machines have distinct advantages over the dumb terminal.

Videotex is like the elephant in the old fable. In the story five blind men tried to describe an elephant by feel alone and they came up with five wildly differing definitions. Videotex is like that elephant. It, too, has been defined by many different people to be many different things.

To some it's shopping at home. To others it's browsing through an electronic newspaper, chatting with friends or sharing information. In simple terms, videotex refers to any computerized retrieval system that allows its users access to remote data bases.

But for our purposes here, videotex means the electronic exchange of data between some central location and the home and, peripherally, the exchange of data between two arbitrary locations, such as two personal-computing workstations.

This definition is somewhat at odds with what most people understand to be videotex. The commonly held perception is of some central data resource which can be accessed by individuals in the home with little more than a sophisticated television set. Such videotex systems are usually provided by commercial enterprises, like banks or merchants' associations, in order to attract customers by offering fast-speed, electronic services and advertising. The wider definition, though, which is now gaining greater acceptance, includes all information exchanges, whether it is accomplished through an organized service or an ad hoc data bank.

The information that makes up a videotex system is stored in centralized, mainframe computers, and is made available to homes or offices via telephone, cable television or airwave transmission. At the receiving end, the data can be decoded and displayed on a modified television set, a specially designed videotex terminal or a personal computer equipped with a modem and appropriate software.

Videotex services can be one-way, like the British Broadcasting Corporation's Ceefax and Independent Broadcasting Authority's Oracle, or they can be two-way interactive systems, like the American-based CompuServe Information Service, Source Telecommunications, the Dow-Jones News Retrieval Service, and the news and teleshopping ventures launched recently by the American Telephone and Telegraph Company.

The one-way services primarily offer their users access to news, weather and sports reports, theater reviews, tele-

vision programming and specialty catalogs presented in a textual format. Worldwide, more than one million homes are equipped to receive one-way teletext information on modified television sets. The vast majority of these homes are in Europe, where the first videotex projects originated in the mid-1970s.

Interactive videotex, on the other hand, offers a much wider range of services, but existing systems have failed to capture more than a handful of subscribers. About a dozen interactive videotex systems of varying quality and size have emerged in the last five years, serving an estimated 87,000 users in North America, Europe and Australia. There is also a score of small-scale tests of these systems now in progress or planned for the near future. Whether videotex finds a niche in the American electronic marketplace or "dies a-borning," as one analyst recently put it, will depend largely on the results of these tests.



Viewtron's "living room of the future," featuring a videotex console, or "customer terminal," against the far wall.

"We really haven't reached the age when consumers perceive a need for general electronic information and are willing to pay a premium for it," says videotex consultant Daniel Miller of Link Resources in Manhattan. Miller predicted that in America, videotex would remain an esoteric service used mostly by special interest groups comprised of farmers, lawyers, doctors, stock-market analysts or personal-computer buffs. While the ultimate effect of videotex on the personal-computer market is unclear, it appears fairly certain that the two phenomena will remain inextricably linked for the next few years at least.

"In the short term, the personal computer end is where

OUTLOOK

most of the videotex action will be concentrated," says Alan Brighish, president of Information Systems Marketing, a videotex consulting firm in Wilton, Conn.

According to industry experts, about 80 percent of the nation's videotex users now access such services through personal computers in the home or at the office, rather than using less expensive dumb terminals (those that can receive and transmit data but generally are not capable of storing or manipulating it).

"With a personal computer, you're not just receiving information," says Apple Computer's Rob Campbell, product marketing manager for applications software. "You can process it as well."

Sue Perchonock, marketing coordinator of the Dow Jones News/Retrieval Service, believes her company has already set the example for a successful marriage between videotex and personal-computing power. Let's say you want to update the value of your portfolio, but don't want to spend all afternoon calling up individual quotes for each stock. Instead, you plug in your modem, dial up Dow Jones and let your personal computer (with the aid of a relatively inexpensive software package) grab the latest quotes from Wall Street.

"The software automatically searches for your stocks, tallies them and evaluates your portfolio," says Perchonock. If you're really worried, you can re-evaluate your portfolio every 90 seconds; that's how often the quotes are updated. And the system lets you go as far back as mid-1979 to get the market information.

With 42,000 subscribers, Dow Jones is the nation's largest videotex service. Not surprisingly, most of its subscribers are investors and businessmen. To capture a wider segment of the videotex user market, however, Dow Jones plans to offer a 21-volume general encyclopedia written for junior and senior high-school students. Designed to be accessed electronically, the encyclopedia will spark family acceptance of its videotex service, Dow Jones hopes.

CompuServe, the nation's second largest service, has 25,000 subscribers, many of whom belong to special interest groups (SIGs), according to Bill Loudon, product manager for personal-computing services. Using the videotex service to keep abreast of new developments in their fields, they have created a dynamic forum for the exchange of high-technology information.

CompuServe SIGs include AVSIG (Aviation Special Interest Group), MAUG (Apple Users Group), LDOS (users of the LDOS operating system for the TRS-80), MUSUS (a group that exchanges information about UCSD Pascal computer language), HUG (users of Heath personal computers) and MNET 11 (owners of H11 and PDP11 computers).

To Michael Rawl, corporate communications manager at The Source, data-base users represent a new breed of

knowledge-hungry consumers. "We tend to think of our 18,500 subscribers as pioneers in the industry," says Rawl, who believes that until dumb terminals become more sophisticated, personal computers are likely to remain the medium of choice when it comes to accessing videotex services.

"People are tired of being passive recipients of information. They want a creative tool at their disposal," Rawl says. "If you accept the concept that the personal computer is an extension of the individual, then the more interactive and the more flexible a videotex service is, the better it is."

Radio Shack's Charles Phillips, the senior vice president of special markets, agrees. He thinks that improved videotex services will broaden the market for personal computers—even though Radio Shack has introduced its own videotex dumb terminal. "Videotex is not the object, per se," he states. "It is just one driving force that will accelerate the age when there's a computer in every home."

But Phillips concedes that the emergence of videotex has sent alternating ripples of enthusiasm and concern throughout the personal-computer industry. What's making manufacturers uncomfortable is the entry of AT&T into the field. Last year, in a cooperative venture with Knight-Ridder newspapers, the telephone company conducted tests of a videotex information system called Viewtron in 125 homes in Coral Gables, Fla.

The Viewtron test used AT&T-designed terminals, rather than modem-equipped personal computers. "We feel the mass market doesn't need a computer on its desktop," says Edwin S. Langsam, an AT&T spokesman. "Videotex, on the other hand, is a much broader system; one that can theoretically involve every home that has a telephone."

Langsam predicts that by 1990, 7 percent of the 80 million homes in the U.S. will be equipped to receive and transmit videotex information. As a step in that direction, this fall AT&T and CBS will inaugurate a seven-month test of their Venture One videotex system in 200 hand-picked homes in Ridgewood, a wealthy community in northern New Jersey.

Once again, AT&T will provide its own hardware for the experiment, which will allow users access to tele-shopping, telebanking and electronic mail services, restaurant guides, meal-planning tips, educational computer programs, stock-market quotes and a daily news digest prepared by CBS. The system will also allow point-to-point communication between user terminals, according to James Bauer, CBS director of business development. "The system will be highly interactive," says Bauer, adding that Ridgewood was chosen specifically because it typifies the "high-income, family-type" environment that is likely to spawn future videotex users.

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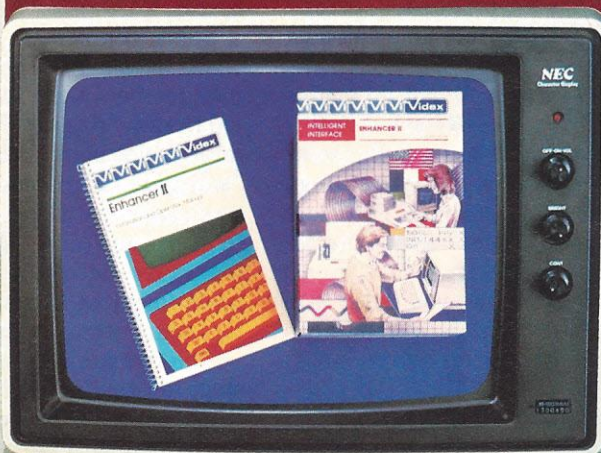
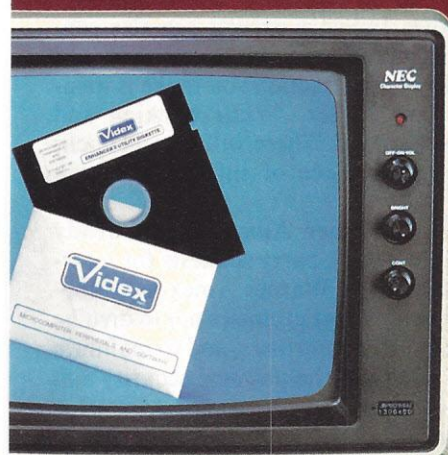
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OUTLOOK

Venture One is designed to give users a choice between two methods of accessing information and services. One method employs a menu-tree structure that allows users to pick from a long list of selections or branches by pressing a designated key on an alphanumeric keypad. The second method enables users to select data directly by entering specific keywords, thus avoiding the cumbersome and time-consuming process of wading through a series of menu-trees.

The system envisioned for Ridgewood will be "radically different" from the Qube cable television systems offered in several cities by Warner Amex Cable Communications, Bauer says.

Initiated four and a half years ago in Columbus, Ohio, Qube won instant acclaim for offering its subscribers a chance to react to television presentations by registering their approval or disapproval on a small console. According to Bauer, Venture One bears little resemblance to Qube. "The choices on Qube are essentially binary—'Do you want to buy this? Did you like the president's speech? Who won this round of the fight?' Venture One will be a fully two-way system."

Venture One users will also be able to call up stories from their local daily newspaper, *The Bergen Evening Record*. Although *The Record*, which has a daily circulation of 147,000, will be the 69th daily newspaper to go on-line with subscribers, company president Michael Heath says he has "serious reservations" about the viability of electronic newspapers.

"The menu is a real problem. How do you index it in such a way that someone who isn't a computer expert can find a story easily? I have some real questions about that."

Heath says he was unimpressed by the potential of videotex to provide useful information for the average person. "The game here will be in transactions," he says. "If you can avoid going to the bank by sitting down at your terminal for two minutes, then you have something."

Similar sentiments are expressed by Kaj Spencer, publisher of *The Advertiser-Tribune*, an 11,500-circulation daily that serves the predominantly blue-collar community of Tiffin, Ohio. "The ultimate proof of the hypothesis will be a profit," Spencer says succinctly. So far, that kind of proof-positive, he acknowledges, is a long way down the road. "The advertisers are simply not going to get the numbers and the demographics to justify putting dollars into it."

The Ridgewood test will also set the stage for a full-scale market trial by AT&T and Knight-Ridder scheduled for 1983 in Miami and Fort Lauderdale.

For that trial, AT&T's highly touted Presentation Level Protocol (PLP) videotex system will be introduced in some 5000 homes. Unlike existing American videotex systems that use relatively crude alphamosaic graphics, the

AT&T system will employ a more sophisticated alphageometric display. Because the alphageometric approach (already used by the Canadian-based Telidon Videotex System) results in the formation of high-quality images, the 1983 market trial will also test the viability of videotex as a display advertising medium.

If serious advertisers can be won over by the enhanced graphic potential of the PLP system, the financial success of videotex would seem assured. But, if advertisers are not impressed, videotex may be remembered in the future as an interesting idea whose time never quite arrived.

"Most observers feel that for videotex to be successful in the U.S., it will have to be supported by advertising," says an AT&T executive. Industry experts are also concerned with the impact of videotex on the privacy and security of its users. "Every transaction you make is monitored," warns consultant Miller. "Your banking and shopping habits will be recorded. There will be well documented accounts of every piece of information you access."

Some companies, like Warner Amex, have already taken steps to limit or deny third-party requests for information about their subscribers. Warner Amex has adopted its own "Code of Privacy" that promises not to divulge information about individual subscribers, and to maintain "adequate safeguards to ensure the physical security and confidentiality of any subscriber information." According to its privacy code, "Warner Amex will refuse requests to make any individual subscriber information available to government agencies in the absence of legal compulsion, i.e., court order, subpoena."

The company promises its subscribers that in the event such information is requested by a government agency, "Warner Amex will promptly notify the subscriber prior to responding if permitted to do so by law."

The other side of the videotex coin suggests a brighter future. Studies by CompuServe and The Source show that the most heavily used features of their services are those that allow users to exchange gossip, news and bits of conversation through the system.

"If you log onto CompuServe on a Saturday night, what you basically see is a lot of people who didn't have dates all sitting around chatting. It's heartbreaking and heartwarming at the same time," says Miller. "By encouraging the free flow of information, videotex brings people together. It's kind of nice—I've already heard of three marriages that resulted from what started out as videotex friendships."

The next major step forward in videotex is likely to be the development of instantaneous cross-referencing between major data bases. If a user's request for information cannot be satisfied at one data base, the request will be routed to another.

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when AT&T's newly developed "loop electronics" are integrated into the telephone network. Loop electronics are expected to increase radically the amount of encoded videotex information transmitted by the telephone network.

Beyond loop electronics looms the promise of laser transmission through fiber optics. And beyond fiber optics is satellite transmission and cellular radio to allow users of handheld videotex terminals to stay in constant touch with remote data bases. Touch screens, voice recognition and natural languages are also just around the corner, according to Apple's Campbell, who maintains that the personal-computing industry is keeping pace with the demands of videotex. "We're paralleling or leading the growth of that industry," Campbell says confidently.

What direction the leading edge of videotex will take is still anybody's guess. Complicated sign-on procedures, cumbersome menu-tree accessing, high cost and the absence of a quality print capability will undoubtedly hamper widespread acceptance for the time being. One thing is certain, however. With major corporations like AT&T,

CBS, Warner Amex, Times-Mirror, Knight-Ridder, RCA, Apple and Tandy jockeying for position in the electronic information marketplace, the future of videotex is likely to be as exciting as it is unpredictable.

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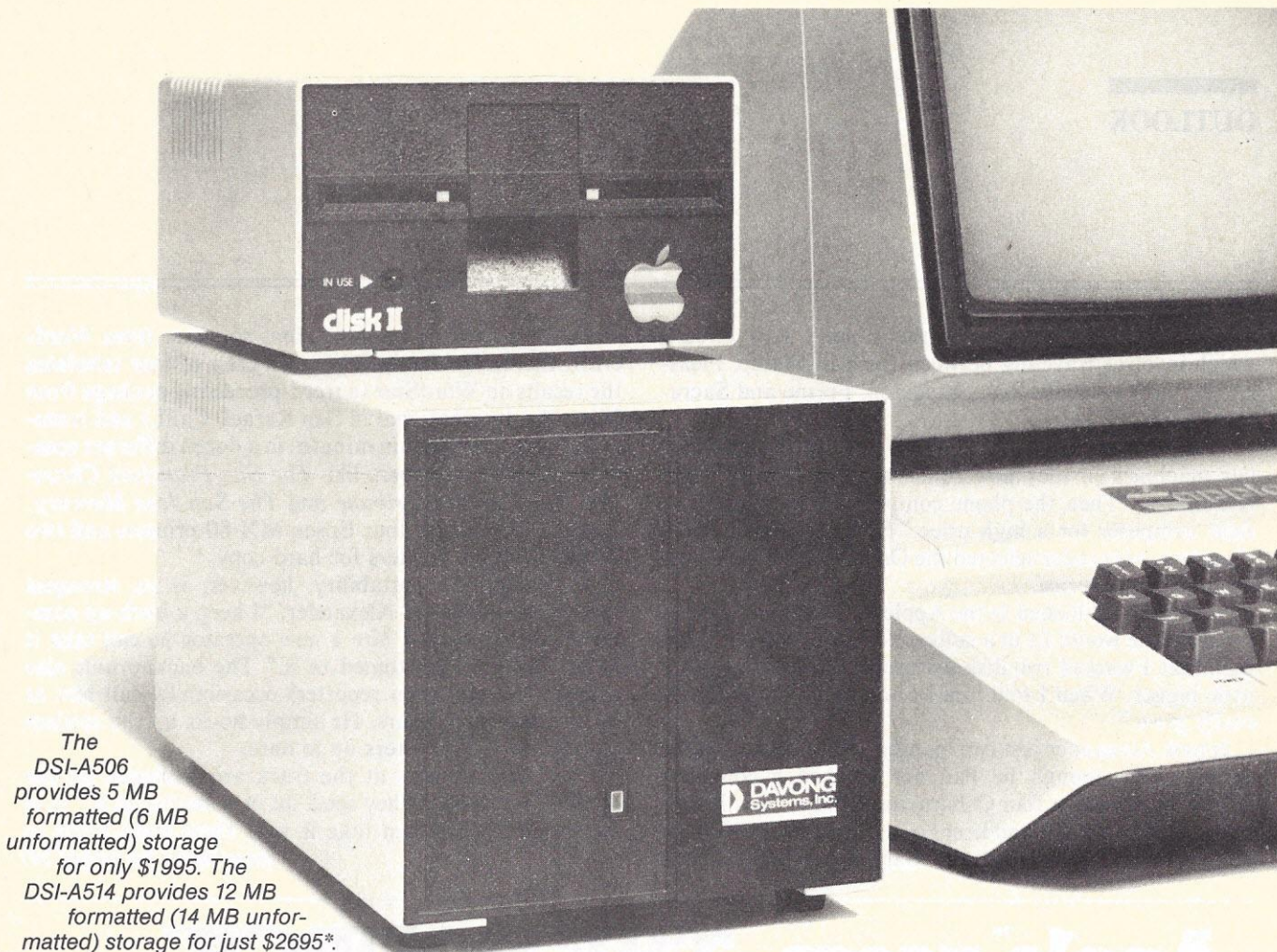
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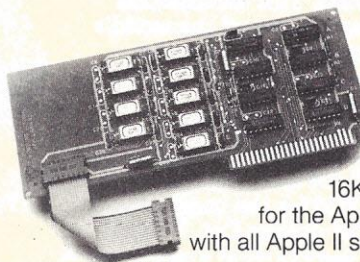
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OUTLOOK

also handles race results for the County Fair circuit, which involves traveling between the San Mateo, Pleasanton, Vallejo, Santa Rosa, Stockton, Fresno and Sacramento County Fairs.

"The teletype company stopped making the parts for our machines so they now refuse to repair them," says Alexander. "Then the phone company offered to sell us their computer for a high price." So after some careful shopping, Alexander selected the Osborne 1 because of its portability and price.

"Originally, I looked at the Apple II. I was assured that the machine would fit in a suitcase. Then I told the salesman that I wanted two disk drives and the suitcase got a little bigger. When I told him I also needed a monitor, it really grew."

It took Alexander just two months to set up his Osborne system, even though he had not touched a computer before. He now uses four Osbornes at Golden Gate Fields, two at Bay Meadows and keeps one as a backup. With the help of a Hayes (Norcross, Ga.) SmartModem and

The Micro Link (communications software from Wordcraft, Inc. in Oakland, Calif.), his crew of four tabulates the results on WordStar (a word-processing package from MicroPro International in San Rafael, Calif.) and transmits the winners within minutes to a dozen different computer systems at papers like *The San Francisco Chronicle*, *The Oakland Tribune* and *The San Jose Mercury*. Alexander also uses four Epson MX-80 printers and two Okidata M82A printers for hard copy.

The Osborne's portability, however, is its strongest feature, according to Alexander. "I keep a back-up computer so that when I hire a new operator he can take it home and get accustomed to it." The backup unit also comes in handy when reporters occasionally call him at home after track hours. He simply hooks up the modem and brings the reporters up to date.

The horse trainers at the track are intrigued by the computer as well. "They see a lot of potential in it," says Alexander. "They can take it with them from track to

(continued on page 153)

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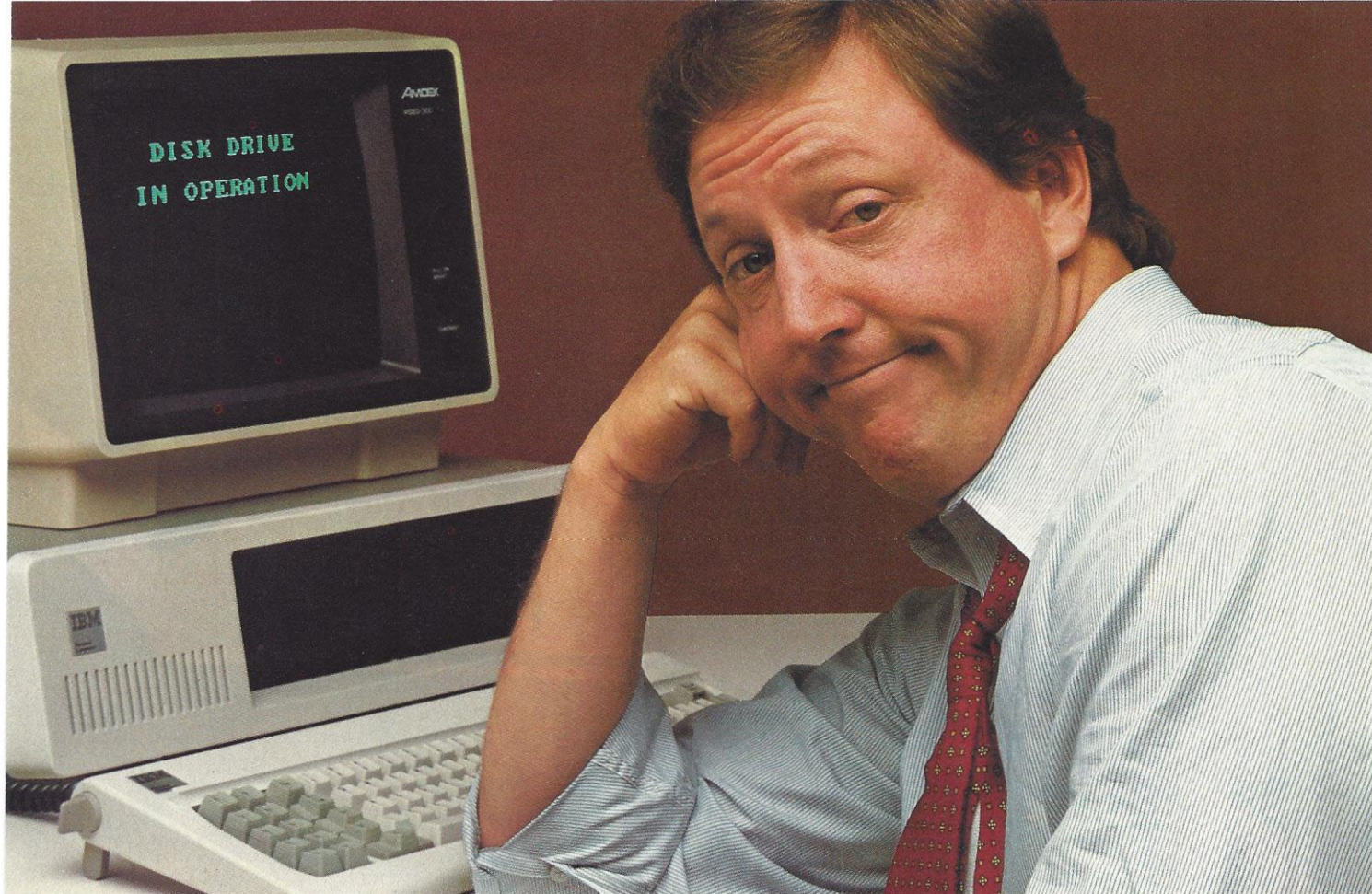


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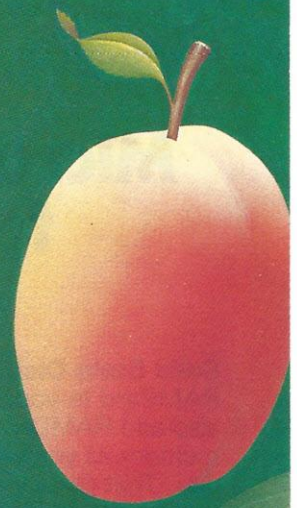
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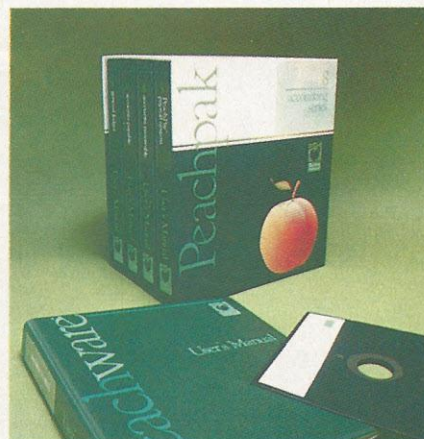
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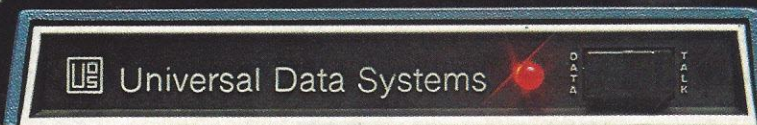


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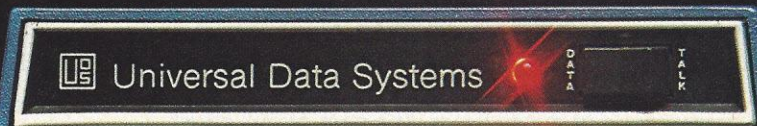


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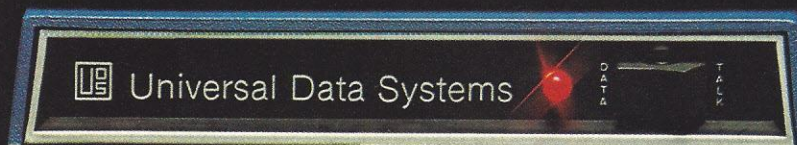
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An Interview With William Turner

When you step off a plane in Lubbock, Texas, you expect to find people who speak with an engaging southwestern drawl. And that's usually the case... unless the person you're visiting is William J. Turner of Texas Instruments.

Born and raised in Maine, where he acquired his unexpected New England accent, Turner is a recent immigrant to the flat West Texas prairie. Before he came to Lubbock, where the TI 99/4A home computer is manufactured, Turner was a marketing manager for Digital Equipment Corp., which is headquartered in Maynard, Mass. At that firm, Turner was involved with distributed processing for commercial businesses.

This past experience might seem to be little qualification for Turner to assume his present position, that of marketing manager for consumer electronics for Texas Instruments (where, by the way, he's now fondly called "Billy Jim"). But one can assume that things must be going well, for just before Personal Computing arrived on the scene in Lubbock, Turner, 38, was promoted to the rank of assistant vice president of TI. "I had to win my spurs first," Turner jokes, noting that he's been with the firm for two years, and that the position carries assistant VP status in other areas of the company. Since our visit Turner has been promoted again to worldwide general manager of the consumer group.

Turner freely admits that while TI has made its mistakes in the home-computer part of the personal-computer industry, it has learned from each one. But he points to the company's past experiences in calculators as proof that TI is now ready to carve out a large part of the mar-

ket for itself. If he's right, it will certainly be a turnaround for TI, which is hardly the home-computer leader now. If he's wrong...

Why are we seeing the home market for personal computers growing so fast now as opposed to a year ago?

Turner: There are two major thrusts that have boosted the development of the home computer market. One is simply that the computer has become less expensive so that now it is a reasonable personal purchase. More im-

"People are buying home computers to improve on what their children are getting in school."



portantly, however, is the continuing video expansion in the home. You look at the people who are buying home computers today, and they are the same people who purchased video-tape recorders, video disks, projection screen TVs and, most importantly, the video games of four years ago.

Why do you say "most importantly" video games?

Turner: The video game is so important because it is the only interactive video product. Up until the advent of video games, color TVs, projection screens, video tapes and video disks were all "press a button and sit back and watch it happen." The video game was the first product that caused people to interact with a video product. It wasn't just press one button; it was a situation where you had to interact continually with the screen.

What you're saying then is that people began to ask themselves, 'What else can I do on a microprocessor-driven video product?'

Turner: Exactly. And that next "what else" is answered by the home computer, which ranges in applications from video games, to home management, to keeping a checkbook balance, to doing financial alternatives, to education for children and adults, to data-base access.

So people are really becoming conditioned not only to expect more but to demand more from their video products, aren't they?

Turner: I think so. Video games, in a few years, will probably become popular items in garage sales. And that's not because people are disgusted with the video game product; it's because they've grown through it. The bottom line of this whole business is that video is hot, and we think the home com-

INTERVIEW

puter is the next hot video product. While the \$300 to \$500 starting price for a home computer is a lot of money in one sense, if you look at the amount of money consumers have spent on games—\$150 for the machine, \$12 to \$20 per cartridge—it all adds up to the same amount.

When you say "consumers," exactly what segment of the market are you talking about?

Turner: Well, the largest percentage of people buying home computers today are earning \$30,000 to \$40,000 in annual family income, but we're seeing a very rapid trend to the \$20,000 income. I think that's due in part to credit buying. But it also means we're seeing a switch from outdoor purchases for the family—like camping equipment, tents, boats and so on—to indoor family purchases, such as video equipment.

Why is that, do you think?

Turner: Energy costs are one reason. Travel by car especially has become terribly expensive. But another reason is that with both parents often working these days, there is frequently a time conflict that forces people to do things closer to home; they simply cannot get away on a family vacation as often as they would like. A third reason is that families are much more concerned these days with being together. And they can be together, functioning as a family unit, much more effectively in the home than almost anywhere else.

To what extent, if any, is the present state of the economy a factor in all this?

Turner: The economy is, of course, a factor. But there is a whole assortment of reasons why people are now buying home computers. One of the most important is that people are looking to supplement their own education and to improve on what their children are getting in school. There is certainly a perception in parents' minds, whether it's true or not, that the quality of public education is declining. The home computer delivers

educational capabilities in the sense that it helps a child to understand computers in the home, whatever else may be happening at school.

One point I want to stress here is that people who bought home computers first were generally people who were somehow involved with computers in their daily work. These were the people who had the earliest awareness that computers are a very important factor in our society today, and will be an even more important factor tomorrow. But the buyer demographics, as I said earlier, are now shifting. This tells us that the early phenomenon of technicians-only buying the product is rapidly changing, and the market is now getting into the mass consumer area. This, what's

"Consumers are beginning to think that every home should have a computer."



more, is really the first year of that trend, so it's a very important, very critical year in home-computers.

Software is one of the keys to ensuring that the personal-computer market continues to expand, isn't it?

Turner: Software is critical because it is part of the so-called after-market of the home computer. To get an idea of the importance of that market, you can look at it in the following way: In 1981, for every dollar of computer consoles we shipped, we also shipped 50 cents worth of accessories, peripherals and software. In 1982, for every dollar of console shipped or purchased at retail, we're seeing over a dollar in after-market. And we think that by 1985, its likely to be \$3 of after-market for every dollar of console shipped.

How are you attempting to meet this projected need?

Turner: We've designed software packages with a wide range of applications from the five generic categories—home management, education, computer literacy, data-base access and entertainment—and we're now adding in home business. But also, within each of those categories, we're developing packages that will differ in suitability for different variables. Take the matter of age, for instance. In the education category, we have a package for the kindergarten student in math, the kindergarten student in reading, spelling, etc. And for every succeeding grade, we have a new package in each of those subject areas. So as the child grows, the parent can buy a new package to keep pace.

So the computer itself actually grows with the child, in a way?

Turner: Right, the computer grows with the child. But more than that, it grows with the entire family. In the computer literacy area, for example, we have a product for the beginner, TI BASIC; we have a product for the student, TI Extended BASIC; we have a product for the expert, Pascal or assembly language; and, of course,

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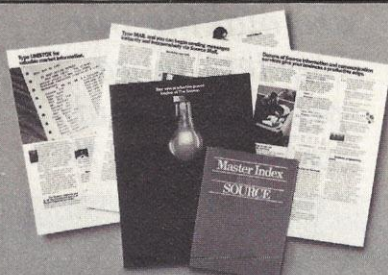
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INTERVIEW

we have a product for the child, too—TI LOGO. So our whole concept in computer literacy is to hit each level of use and each age level of use to meet the evolving needs not only of the family as a whole but each member of that family. Our strategy is also to develop peripherals that go along with those software variations and will also pull through additional hardware sales.

You fellows are making software very easy to use, aren't you?

Turner: Well, I think there are two sides to computer literacy. One side, which we view as equally important as the more traditional view of learning programs, is simply learning to be comfortable with computers. So to that end, our whole design concept of software is to use voice, color, sound and music for the beginning user, whatever his age, to eliminate the intimidation factor in using a computer, which has certainly been a consideration in sales up to now.

So in that sense, learning to use a personal computer now is a lot like learning to type, isn't it? It's not that big a deal?

Turner: Yes...and no. I think it is likely that the non-technically oriented person will use the product merely as a tool to run application packages. On the other hand, I think that there is another segment of the audience, made up of students or technically oriented professionals, who very much believe that you need to understand the process of computer programming and all of its different languages, from BASIC to Pascal to FORTRAN to LOGO. They want to know how a computer works, and how it is that people program them to do things. They want to understand the concept. And the basic concept of how a computer works and how you direct it is going to be very important for a person who's going to participate heavily in society in the late '80s and the '90s. So obviously, we need a product that can go the entire range of computer literacy and yet

make it easy for the entry person also to learn, if he wants to, all he needs to know at each stage of his progress.

You mentioned earlier five application areas, but it seems to me that many of the specific applications in these areas could be done just as easily with a pencil and paper. Like keeping a Christmas-card list, or a list of Tupperware clients—things like that. After all, people have been running home businesses for years without home computers. Why should they suddenly want to buy a home computer to do this?

Turner: Well, I think there are two or three good reasons. Sure, no one will argue with you that a \$300-to-\$500 purchase to keep track of a family budget is probably not a good in-

“Personal computers are making our society more productive and cost-effective.”



vestment as compared to the alternative of a set of 3-by-5-inch file cards, a pencil, a good memory and a good desk drawer to store them in, plus a shoe box to put the 3-by-5 cards in. But the fact is, people don't justify their purchase of this product for any one reason. People don't buy computers simply to automate their checkbooks. They don't buy computers just to keep track of Christmas-card lists. What people traditionally do is look at a multitude of reasons to buy this product, ranging anywhere from "I simply want a computer in my house because computers are inevitable" to "I want the next video product that can do something for every person in my family from games to education to home management."

At this point, a \$30 module add-on to do my checkbook balance versus a \$30 calculator begins to seem a reasonable tradeoff. But, certainly, a \$300 console and a \$30 module can't compete economically against a pencil and a 3-by-5-inch file card. So I think you have to view it as an assortment of reasons for buying a home computer. No one reason will do in and of itself. So you have to provide a wide variety of packages for a wide variety of users with a wide range of skills and interests to motivate a person or family to buy the product.

So again, it's a case of "what else can I do with my personal computer?" Isn't that right?

Turner: It's "what else can I do with it," but the answer has to be a large number of "what elses," or the promise of a large number of "what elses," even if I don't choose to buy them all today. The fact that I know that I can buy them and they'll be around for a long time—and the software will also be there for the next five or 10 years—is very important. That's why we at TI built a 16-bit product early on while our competitors were building 8-bit products. We're convinced that a piece of software has to last for a long while, and the life

(continued on page 121)

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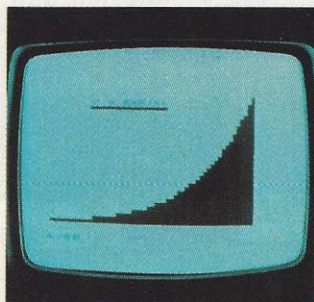
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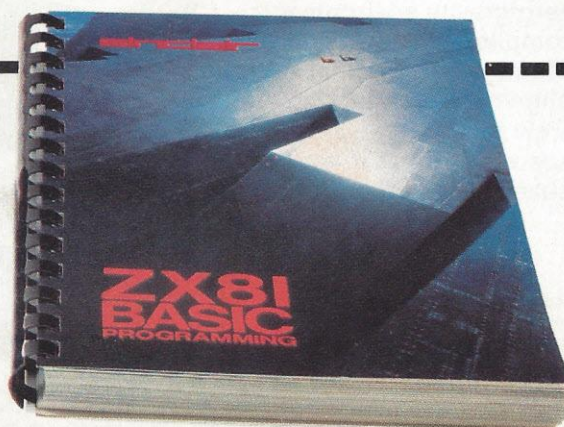
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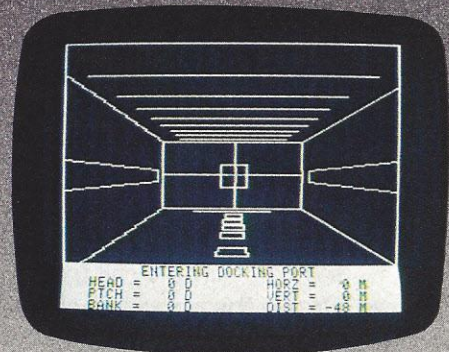
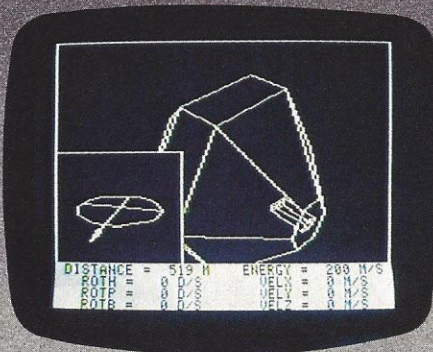
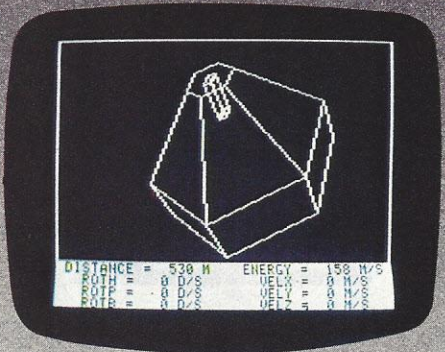
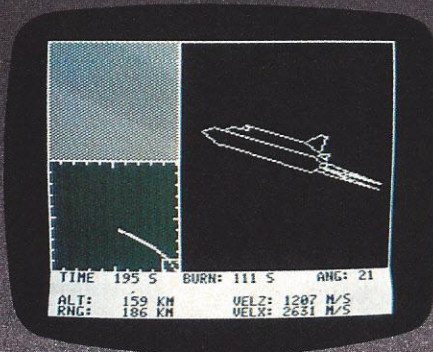
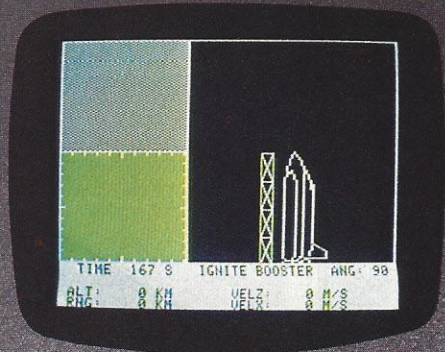
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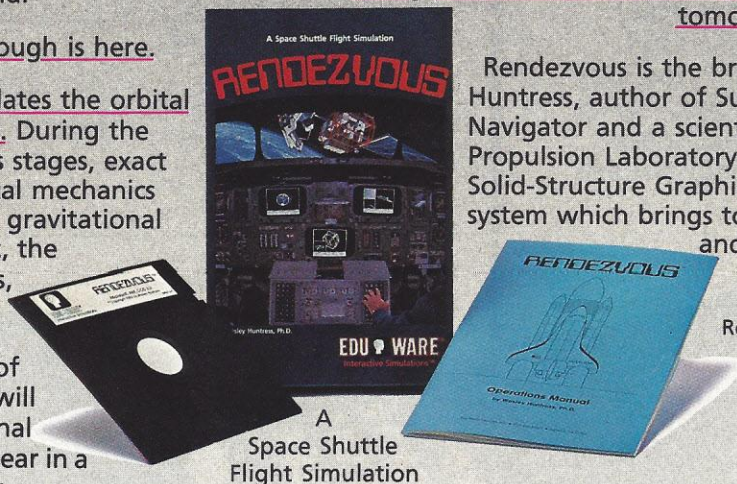
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CIRCLE 17

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Privacy In Spite Of Videotex

Videotex services can be a boon to people. But they carry a latent danger. Policies need to be developed that will maximize the benefit, but minimize the danger

by David Gabel

The right of the people to be secure in their persons, houses, papers and effects against unreasonable searches and seizures, shall not be violated . . .

Fourth Amendment to the Constitution of the United States.

The telescreen was giving forth an ear-splitting whistle which continued on the same note for thirty seconds. It was nought seven fifteen, getting-up time for office workers. . . . The Physical Jerks would begin in fifteen minutes. . . .

"Thirty to forty group!" yapped a piercing female voice. "Thirty to forty group! Take your places, please. Thirties to forties."

Winston sprang to attention in front of the telescreen, upon which the image of a youngish woman, scrawny but muscular, dressed in a tunic and gym shoes, had already appeared.

"Arms bending and stretching!" she rapped out. "Take your time by me. One, two, three, four! One, two, three, four! Come on comrades, put a bit of life into it! One, two, three, four! One, two, three, four. . . ."

Nineteen Eighty-Four by George Orwell.*

These two passages are diametrically opposed. The first is a small part of the political philosophy upon which America was founded. And, since personal computing is an

American institution, it benefits from that philosophy. The second is from a bleak look at a future where all the individuality in the human race has been homogenized in service to the state.

They say that science-fiction writers are somehow gifted with the ability to see into the future. That might be true enough inasmuch as some writers have been able to theorize that man would walk on the moon, send rockets to other planets and explore little known portions of the galaxy. All this is happening. But if one were to consider carefully science-fiction writing, it's likely that he would arrive at the belief that writers of the genre mainly take current technology and try to project it logically into the future.

Sometimes technology overtakes the imaginations of the writers, and real events appear to reflect that which was predicted years earlier. Sometimes, however, budget constraints, political realities or technology itself make our lives take a different path. It doesn't look as if we'll have the nuclear-weapons stockpile on the moon that I read about as a youth back in the '50s. The author of that bit of fiction had placed his story in the latter part of this century.

But the frightening technology that George Orwell wrote about is here. Now. Videotex can do everything that Orwell's Big Brother and telescreens could. Obviously, we have to see that that never happens.

Videotex, by which we mean two-way data communications from some central location to every home equip-

ped with a minimal data-communications device (it could be a telephone and a TV set), is a two-edged sword, like many things in life. There's so much good that can come of it: much easier shopping, with store catalogs displayed on the TV screen and the shoppers' desires communicated to the retail outlet through a calculator-like keypad; electronic banking, with balances displayed on video screens after the teletext system has determined that the user is authorized to access the information; instant nation-wide polls—these are all possible. Some have even said that the president could be elected in a true nationwide referendum, with no need for voters to leave their homes to go to the polling place.

Some instant feedback

Indeed, it's all being done today. A California bank has a system where a customer can pay bills through a telephone's touch-tone keypad. The Qube system in Columbus, Ohio, gets instant feedback from its users about television shows they've just seen.

And that's fine. These efforts will lead almost certainly to a better life for those able to take advantage of them. The fact that the efforts are being undertaken by private concerns, interested in developing a service into a commercially viable product, is encouraging in this regard. It's reasonable to assume that these private concerns will be interested in providing services with their teletext that the public will view as desirable, rather than developing capabilities that the public could view as dangerous.

*From NINETEEN EIGHTY FOUR, by George Orwell, copyright 1949 by Harcourt Brace Jovanovich, Inc.; renewed 1977 by Sonia Brownell Orwell. Reprinted by permission of the publisher.

"For the first time in history, peoples' homes can be invaded when there's no physical invasion."

It wasn't long ago that the Nixon administration developed a list of enemies. And those enemies were subject to all kinds of questionable surveillance activities, including wiretaps. No one, surely, would argue that the telephone is a machine that the public should view as dangerous; yet that device can be used to invade anyone's privacy. True, court orders are needed, and safeguards have been put into place that make legal wiretaps much more difficult than they were a few years ago. But still the record of the White House plumbers and their efforts to stop information leaks give pause to us all.

A reason for concern

People are concerned about their privacy more today than they have been in the past because of things like wiretaps. For the first time in history, peoples' homes can be invaded when there's no physical invasion. People actually pay to install the instrument by which their privacy may be invaded. And that's only the beginning.

Add the computer to the telephone. It's been said that a good investigator can find out more about our lives than our spouses know. This can be done simply by looking at the records of our financial transactions, all of which are safely in some computer's memory, somewhere. If we know how to get the information out, we find there is a complete record of where we were, how much we spent and with whom.

Take my situation, for example. A good detective, looking at the records I strew carelessly behind me, could very easily determine:

- That I live in New York State.
- That I work in northern New Jersey.
- That I have occasional business luncheons.
- That I am employed by *Personal Computing*.
- That my personal debt is heavy, but manageable.

If he were really good, such a per-

son could deduce that my work has something to do with the electronics industry or the computer industry because of the geographical distribution of the purchases I make. He can even determine just about what my salary is.

That's OK with me because that information is available to lots of people anyway. But if a detective can find out all those things about me, who's to say that the government can't do it, too. And just what right does the government have to know where I had lunch yesterday?

Each of us has certain information about himself that the Constitution says should be private. We are to be protected from unreasonable search. In light of that, it's sobering to think that we're open books, provided the right detective can get to the information we leave on record. And we don't even have videotex services yet on any great scale in this country.

What will happen when we do? What will be the result when we do our shopping over a telephone line or a cable that we have hooked up to our television set? Will there be any greater safeguards on private information when we can simply tell the supermarket to deliver a bag of groceries and debit our bank account for the purchase price?

A code of privacy

One of our Outlook stories this month reports on the videotex phenomenon. The author notes that some companies have adopted a code of privacy about the information they will possess relating to their subscribers. They will maintain the confidentiality of that information, they promise. In addition, the report notes, one company, if required by a government agency to reveal information about a customer, will notify the customer prior to releasing such information "if allowed to do so by law."

And that's the rub. What will the law be like?

The Privacy Act of 1974 requires

that information kept in government files shall be safeguarded. There are a number of specific procedures in the law that must be followed. Whether they are followed totally is anyone's guess. The more global question, though, is: "What of private data banks?"

There are no laws concerning the security of personal information kept in private data banks. In fact, there are some data banks—credit bureaus, for example—whose purpose is to provide information about you and me to their clients. Who is to say what the information in such data banks is being used for? Right now, it's only the individuals who run the bureaus.

Dangerous waters

It's not hard to make a case here for new legislation to control this electronic transfer of information into and out of the home. But if you're the cynical type, you might feel that any new legislation would only allow the government into another area where it doesn't belong. And even if that prospect had no real validity, how could government, in these times of declining federal spending, reduced revenue sharing and shrinking bureaucracy, enforce any law that it chose to bring into being to safeguard the peoples' right to be secure in their homes?

Like most questions of public policy, this one has no simple solution, and I don't presume to propose one here. What can be said, however, is that this society will have to come to grips with the issue soon, assuming that videotex technology begins to develop into the service it has the potential of becoming. A consensus will have to take form about the proper role of society, private enterprise and government alike in the videotex era. And the ones who are to form that consensus will surely be the ones who have experience with the technology. And that's no one but owners and

(continued on page 124)

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CIRCLE 19

A Hard Look At The World Of Educational Computing

The real crisis facing schools is not a software shortfall but a hardware crunch accompanied by misconceptions about how computers can help children learn

by David Grady

For the next five years," it begins portentously, "demand for educational microcomputer software will outstrip supply two-to-one." This ominous prediction appears in a press release from Talmis, an Oak Park, Ill.-based consultancy, and is culled from the firm's recent report, *The Educational Software Market*. Were it not for the specific numbers it contains, Talmis' forecast would represent little more than another "more hardware means you need more software" observation. But experience with educational publishing teaches extreme skepticism of all statements bearing numbers, so the question cannot be ducked: What exactly does "will outstrip supply two-to-one" mean?

A later sentence deepens the unease: "Demand for educational courseware is expected to be at least \$75 million by 1985, rising from sales of \$10.7 million for the 1980-81 school year." Are they choosing their

words carefully here? In a seller's market, "sales" is, after all, a synonym for "supply." Do they mean then that actual sales in 1985 will be only \$37.5 million—one half of \$75 million—since supply will fall short of demand by a factor of two? And did schools actually have \$21.4 million to shell out for educational software in 1980-81, but were able to spend only half that much because of a scarcity of suitable products?

The idea that schools had a spare \$10.7 million to spend on anything flies directly in the face of the recent spate of school closings, budget cuts and taxpayer rebellions.

The Talmis release continues: "Although publishers are gearing up, the development process for courseware is fairly lengthy so that growth in available commercial quality software will be slower than growth in the installed base of microcomputers in educational institutions." Maybe Talmis means that there will be only enough software to keep the computers running half the time.

But is that really credible? Will

schools truly have so many computers that they won't know what to do with them? It's hard to imagine most junior highs and high schools equipped with enough computers to meet even the natural student demand for good programming classes, let alone demand for other uses. So how could it come to pass that schools will suffer from a desperate, gnawing, never more than half-fed hunger for new software?

Not enough hardware

It's tempting to simply dismiss the Talmis prognostication on grounds of poorly informed writing and move on to some better grounded and compellingly composed vision of the future. But if long association with schools teaches suspicion of sentences with numbers, it also teaches that simple ideas rarely prevail over more baroque ones. In fact, the Talmis vision merits more respectful scrutiny precisely because it seems not to make sense. And, perhaps more importantly, as we consider information to overcome the apparent Talmis inaccuracies, we are left with an un-

David Grady is a West Coast education writer who is actively involved in the computerized education issue.



mistakable picture of the real crisis in computer education—the lack of enough hardware.

Consider some basic facts. Last year there were approximately 46 million children in grades kindergarten through 12 in public and private schools. During a typical school week containing approximately 1900 instructional minutes, those children had access to somewhere between 52,000 and 150,000 computers, depending on whose estimates you choose to believe. Going with the larger number for sake of argument, simple multiplication yields a figure of 288,800,000 available computer minutes each week. Divide that time evenly among the students and you come up with only a little more than six minutes per student per week. Further, assuming the purchase at today's prices of computers capable of running LOGO, an educational program, merely doubling the amount of available machine time, would cost over \$200 million; to provide up to 30 minutes per child per week, it would cost over \$1 billion. In 1980-81, schools spent only \$273 mil-

lion on all audiovisual and library materials and equipment.

Of course, the situation is actually more complicated than that. In fact, computers are distributed differently across the grades—more in high schools, fewer at the elementary level—and along economic lines—more for rich schools, fewer for the poor. School policies and day lengths vary as well. As a result, some students now have a lot more available computer minutes than others. But no matter. In all but a negligible number of schools six minutes per student per week at a computer is the average.

Let's get literate

At the same time, the notion that everyone must become computer literate has entered the civic mind. Never mind that pinning down the meaning of "literate" makes nailing jelly to a tree look like work worth applying for. There is certainly good reason to believe that people who learn to use computers to solve problems will have vocational and perhaps other advantages over those who

don't. But if that's what computer literacy should mean—and Arthur Luerhman (*Mathematics Teacher*, December 1981) argues eloquently that we must not settle for a less demanding definition—then it's ludicrous to expect schools to deliver it to everyone with only enough computers to provide six, 12 or even 20 minutes per student per week. It takes time to figure out how to get a computer to do something useful.

The real crisis facing schools is not a software shortfall but a hardware crunch. But changing the gears of educators from the anticipation of a lack of programs to the expectation of few computers in the schools will be a thankless chore. Exceptional teachers will set up before- and after-school computer clubs, and will devise ingenious schedules and methods for stretching the available machine time across as many students as possible. And manufacturers like Apple, with its offer to provide a computer to every school in the country in return for tax breaks, can start to make a difference.

And that, believe it or not, is the



good news. The bad news is that there's another application for school computers that threatens to crowd out attempts at teaching computer literacy—along with everything else. Called computer-assisted instruction (and, in a more elaborate form, computer-managed instruction), its point is not to teach students how to use computers; rather, it uses computers to deliver information about other subjects—math, perhaps, or grammar or biology.

This area is probably what Talmis had in mind when predicting a software shortfall; certainly it's a kind of computer use guaranteed to be software-intensive. It's also the kind of computer use that many experts are increasingly wary of. Educational researcher Vicki Blum Cohen, describing a study she did for the Educational Product Information Exchange of New York City, said that after studying six of the "larger curriculum packages produced by publishers," she concluded that the software did little more than aid memorization of previously examined facts.

Not everyone agrees with her, of course. Critics of her study are quick to point out that the conclusions are based only on expert review of the materials and not on any measurement of their effectiveness in the classroom. For those who've followed the CAI debate over the years, that exchange will sound yawningly familiar. Critics look at typical CAI materials and demand something a bit more conceptually stimulating. Devotees point to higher test scores clearly produced by the use of CAI materials.

What to do?

But that debate is missing the point. Most of us are walking proof that reading, writing and arithmetic can be learned without the aid of computers. And few would claim that our persistent failure to make everyone succeed in school is a technological problem. The real issue is not CAI versus more traditional kinds of instruction; it's what we should do about scarce school-computer time, a problem that threatens to continue well into the decade. How do we sort

through all the facets of education, and which of them should be taught with the aid of computers?

Consider a simple example. There are several programs available that flash a map of the United States on the computer screen and ask users to name the states and their capitals. Try justifying using that program simply on the basis of the information mastered, and you're sure to be countered by the argument that the computer could be better used as a reference tool. Try justifying it on grounds that it builds general memorization skills and you'll be told that a set of flashcards would serve the same purpose.

Programs designed to teach reading don't necessarily fare much better. Reading, after all, is best done with books. While some initial computer-based alphabet and phonics drills might be useful, nothing is gained by keeping children at consoles doing exercises once they have sufficiently mastered their skills. Must not scarce learning time be taken into account here? With a world full of good books to



read, songs to sing, and pictures to paint, computer-based exercises should have to earn their way into the school day by delivering at least as much value as whatever they replace. And there is the rub. Sad to say, though, the replacement of existing tedium with the latest, most up-to-date tedium is an activity as old as the schools themselves. Imagine Charles Dickens' Mr. Gradgrind and his obsession with facts with a computer at his disposal. The orderly precision of computer responses and printouts would have seemed to him gifts directly from the hands of the Almighty—as indeed they must also seem to the modern administrator anxious to deliver to his constituents reassuringly quantitative statements about the progress of the students in his school or district.

High-tech fix

If an inadequately hardware-supported mandate for universal computer literacy threatens all by itself to eat up all computer time, just imagine the result of adding to it the desire for a quick high-tech fix for

our persistent difficulties with more old-fashioned kinds of literacy and education. Suddenly the Talmis predictions begin to look if anything understated. Five years? The software needed to deliver on those goals won't be written for a hundred or a thousand years. Two-to-one? How about 10-to-one or 10 million-to-one? And what of the students not demanding anything more than the chance to learn to use the computer to do things? What will become of them?

Seymour Papert, author of *Mindstorms* and developer of LOGO, told a story at the Seventh Annual West Coast Computer Faire last March that suggests an answer at once both heartening and insane.

Papert talked about the children at the Lamplighter School in Dallas, Texas, who are blessed with ready access to a large number of computers and plenty of time to use them. The language they use—TI's LOGO—has two basic modes: turtle graphics, with which the programmer can direct a cursor to draw pictures by telling it how far to go in what direction; and sprites, with which the pro-

grammer can determine speed and direction for a large number of moving cursors (of various specifiable shapes and colors), all of which may be on the screen simultaneously.

Some forbidden knowledge

At the beginning of the project the staff decided to teach the first-graders turtle graphics only, saving the more complicated sprites for the third-graders. But the day came when a first-grader knew just enough to ask a third-grader, "How do you make it do that?" and just enough to understand at least some parts of the answer. Armed with this forbidden knowledge, he quickly spread it among his first-grade colleagues, many of whom began eager experimentation with the new-found power. Some days later Papert had a lengthy conversation with the young whippersnapper, who told him in essence (and with great seriousness): "We've discovered that numbers are a kind of code for telling the sprites where to go. We haven't broken the code yet, but we're working on it."

The point? Children will always



find a way. They will use each other, plus all the home computers, computer clubs, and library computers they can get their hands on to do an end run around adults who don't take their desire for genuine computer literacy seriously. School could be a real help to children entering the era of personal computing, rather than another set of barriers for them to overcome to prove their mettle. With the useful software that is already on the market, children could be taught more about computers and computer use than had ever been imagined. All that's necessary is investment in enough computers and in the time it would take to devise test problems for children that could be solved with VisiCalc, Wordstar, PFS, LOGO, BASIC, Pascal and other such programs.

But that's too simple. Educators apparently are saving on the hardware, then complaining about the woeful quality of educational software.

Perhaps teachers are afraid of error. Did you ever play Pac-Man in front of a crowd of 13-year-old sharks


whispering to each other about "P-4 tunnel patterns" and barely suppressing snickers at adult ineptitude? Imagine then the plight of the teacher with a roomful of children, a hopelessly inadequate supply of computer time and a gallery filled with an odd assortment of taxpayers, parents, theoreticians, managers and reporters—all eager to pounce on the slightest deviation from their own personal notions of how to get maximum return on every computer-invested dollar and minute.

A saner, healthier future

It doesn't have to be like that. Apple's canny offer to donate computers to schools in return for a substantial tax write-off points the way toward a saner, healthier future for everyone. If we thought it important enough, we could flood the schools with computers and enlist both teachers and their students in the active search for things to use them for. The demand for trivial software would still exist, of course, because the teachers, administrators, parents and others who want it would still exist. But they

would be far less able to displace from all classrooms the other uses to which computers could be put.

Though piety on behalf of children runs rampant throughout society, we rarely put our money where our mouths are. Most kids' toys, cartoons, films and even books (not to mention teachers' salaries, school budget appropriations, etc.) bear witness to our willingness to shortchange them at least as much as we cheat each other—more in fact because they have not the power to fight back. Perhaps we rely on our deep sense that kid resilience will get them through most anything, rationalizing then as though our spending restraint somehow represented a conscious decision to invest in character development rather than our more pressing desire to go it on the cheap.

It won't wash, though. Finally, we are the critical software. If software demand five years from now outstrips supply by any factor, numerical or otherwise, it will mean only that our imagination and nerve have once again failed the kids on whose behalf we so frequently posture. 

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AUTOMATIC
WHAT-IF

MODE=NORMAL ORDER=R/O ROW=1-50

Available
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ROW 1 (Net Sales) <--
ENTER COMMAND:

ROW	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	5	6
1	1,000.0	1,100.0	1,210.0	1,331.0	4,641.0	44
2	450.0	489.5	532.4	579.0	2,058.9	45
3	200.0	220.0	242.0	266.2	928.2	46
4	300.0	350.0	400.0	450.0	1,500.0	47
5	950.0	1,059.5	1,174.4	1,295.2	4,479.1	48
6	50.0	40.5	35.6	35.8	161.9	49
7	5.0	3.7	2.9	2.7	3.5	50
8	0.0	0.0	0.0	0.0	0.0	51
9	0.0	0.0	0.0	0.0	0.0	52
10	45.0	44.5	44.0	43.5	0.0	53
11	0.0	0.0	0.0	0.0	0.0	54
12	0.0	0.0	0.0	0.0	0.0	55
13	0.0	0.0	0.0	0.0	0.0	56
14	0.0	0.0	0.0	0.0	0.0	57
15	0.0	0.0	0.0	0.0	0.0	58
16	0.0	0.0	0.0	0.0	0.0	59
17	0.0	0.0	0.0	0.0	0.0	

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Computers Let Farmers Get Back To The Soil

Pioneering farmers are bringing personal computers down home to cope with hard times, increase their management power and fend off obsolescence

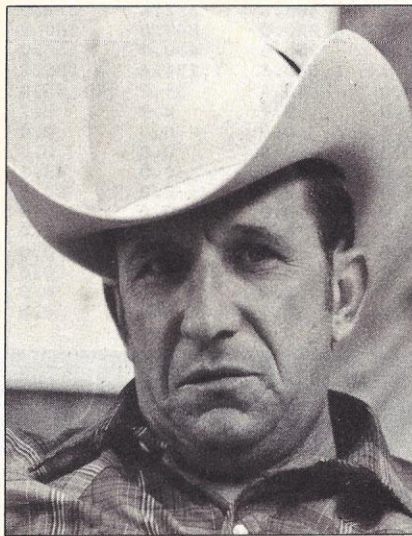
by George DeVault

A few commercial farms still decorate the gently rolling hills of north-central Connecticut. Foremost among them, with more than 1000 acres, 325 Holsteins and 50 purebred Jerseys, is Mountain Dairy, owned by Willard J. Stearns & Sons, Inc. The farm sits atop the second highest hill west of the city of Storrs. And, with its seven upright silos, it creates a skyline all its own.

Mountain Dairy was started by the Stearns family in 1772, a long time before the "green revolution" brought machinery, chemicals and genetics into American farming. It is steeped in tradition. But recently, the latest farming revolution arrived at the dairy to handle its muscle and milk: the personal computer.

"I think it works very well," says Bob Stearns of the dairy's IBM 5100, which was purchased with two diskettes and a printer for about \$18,000. (That's not what you normally think of as a "personal computer," but it is in this case.) "It just had to be programmed. There was no program available from IBM that would do what we needed it to do."

The Stearns needed software that could keep track of the 8000 to 9000 quarts of milk processed into quart and half-gallon glass bottles every



Farm-computer pioneer Bill Enlow: "I'm old-fashioned and thought you always had to do things by hand, but I'm sold on it."

day, and, at the end of the month, send bills to more than 3000 retail customers. "Before we got the computer," Stearns explains, "we had to get extra help—four, five or six people—part-time for a few days a month." But part-time help grew scarce. Family members were busy with other chores. The computer emerged as the only logical answer.

Like Stearns, many farmers who bought personal computers during the late 1970s found software hard to come by. Many bought custom programs. Others designed their own. The result is a homegrown agricul-

tural software industry, and programs for everything from managing pesticides to updating payroll tax records.

\$4 billion market

Mountain Dairy is a pioneer in the farm-computer field, but it won't be the last farmstead to computerize. "Our numbers indicate that within the next five years, there will probably be 500,000 new farm-computer purchases," says Bob Harris, president of Harris Laboratories Inc. of Lincoln, Neb. "We predict an initial purchase market of \$4 billion over that time." That's roughly the amount U.S. farmers spent on pesticides last year, according to the U.S. Department of Agriculture.

Professional farmers are finding it tough to survive in an economy squeezed by high interest rates, says David Roehm, an Ohioan who for three years has been teaching farmers how to put personal computers to work. Computers can help farmers trim operating costs, improve management and wait out the financial crunch, says Roehm. For example, with computerized marketing services, local data banks that keep farmers informed instantly about crop price fluctuations, "you are more in control of when to market a crop," he says. "That's value enough to buy a computer."

Like other enterprising agri-

George DeVault is the editor of New Farm Magazine, a Rodale Press Publication in Emmaus, Penn.

"If they know it or not, many farmers are already dealing with computers whenever they buy seed, feed, fertilizer or even tractors."

businessmen, Harris and Roehm are promoting plans to cash in on the burgeoning demand for personal computers among farmers by producing the highly specialized software needed to run them. Harris Laboratories, one of the largest commercial soil-testing services in the country, began working with computers in 1966. It was the first lab in the world to computerize soil test reports. Then Harris began developing and marketing computer programs for farm supply retailers, fertilizer dealers, grain elevator operators and rural banks.

"Two years ago, we saw incredible interest in computer programs by the farmers themselves," he adds. The result was Harris Technical Systems (HTS), which offers a rapidly growing assortment of agricultural software under the Ag-Disk name. HTS

now has 16 programmers on its staff. Recent software includes farm profit analysis, depreciation schedules, land purchase budgets and loan cost calculations.

A computer buying boom

"This fall," Harris predicts, "the movers and shakers will begin buying first. Next fall, as the agricultural economy is picking up, others will start buying."

David Roehm's Computer Information Services is dedicated not only to producing farm software, but also to helping farmers choose equipment and programs right for their needs.

Roehm, who raises 800 acres of corn, soybeans and winter wheat with his father near Hillsboro, Ohio, began "playing around" with computers as a student at Ohio State University

in the early 1970s. "I didn't really know what was going on there, but I always had it in the back of my mind that a computer might make a good record-keeping system," he recalls. In July 1979, he discarded the TI 59 programmable calculator he had been using and bought a TRS-80 Microcomputer Model I for \$845, with a Radio Shack quick printer.

However, the available software wasn't detailed or flexible enough to meet his needs, so Roehm began writing his own programs. He and a friend became serious students of the computer market, analyzing all available hardware and software, and grilling salesmen about their various products.

"We formed Computer Information Services," Roehm says, "bought a TRS-80 Model III with dual disk



Auctioneer Dub Enlow and his spotter, son Randy (in booth), auction off a Massey-Ferguson 150 tractor. The paperwork used to take days; now it's completed in a matter of hours thanks to Enlow's new personal-computing system.

photos courtesy of Implement & Tractor Magazine

PROFESSIONAL/ MANAGERIAL

drives and VisiCalc for \$2495, and as much farm software as we could get our hands on. I'm teaching a course for farmers this summer that gives beginners what they need to know to talk to computer salesmen. I kind of feel our educators have been giving us some outdated information, saying, 'Wait six or 12 months and someday really good software will be available.' Well, it's starting to come on the market now. We just have to figure out which ones will do the job and which ones are worth the money."

Whether they know it or not, a lot of farmers are already dealing with computers whenever they buy seed, feed, fertilizer or even tractors. Farm machinery auction history was made earlier this year when the Enlow Auction Co. of Sapulpa, Okla., south of Tulsa, turned the bookkeeping for its new two-ring sales outlet over to a TRS-80. "It's sure doing a good job for us," says Bill Enlow, who held his first auction with 11 tractors in 1967. "I'm sort of old-fashioned and

thought you always had to do things by hand, but I'm sold on it."

Bob Enlow, the auction company's bookkeeper and the man who actually uses the computer, was less enthusiastic about it, at least at first. "The first two months, there were some surprises in the program," he says. "There were certain things you had to do, and if you did something wrong, the machine would go out. You had to call the programmer to readjust the thing. It was a problem, and you felt like throwing it out the window. But after you've spent \$4500 on the thing, you give it a chance. After the first couple of sales, we got it pretty well figured out. Seems like every sale you learn a little more."

The younger Enlow adds that customers who at first cursed the computer for making them wait in long lines during breakdowns now love the quick service it provides. "The sellers like getting paid the same day of the sale," he says, "and it cuts down on errors. It really improves the auction."



Farmer-bookkeeper Bob Enlow at the console of his new TRS-80: "Seems like every sale you learn a little more . . . it's made the money back right now."

Enlow has assigned numbers to each of his 400 regular customers, most of whom are farm equipment dealers from around the country. Newcomers receive special numbers. All the ID numbers go into the computer. Then, when buyers give their numbers to the auction clerk, the computer prints a description of what they bought and how much they paid for it. For sellers, the computer calculates the commission due the auction company, and tracks any unsold consignment items. Usually by early evening, all money is in the right hands and Enlow has seller and buyer recap printouts for his permanent files.

"Before," he says, "we'd sit down that night and figure it out. Then we came in all of Monday and wrote checks. It's cut us out of eight hours of work with four people. It's made its money back right now."

Financial wizardry

Speeding up the financial side of farming was the reason J. Luis Rodriguez shelled out \$22,000 for a DEC (Maynard, Mass.) 308 computer nearly five years ago. Rodriguez, who grows 500 acres of tomatoes and eggplant from November through May west of Boynton Beach, Fla., says he usually has from \$300,000 to \$600,000 in accounts receivable at any one time. "With the computer, we get our billing out in the morning for everything shipped the previous day," he says. "Billing for that money and getting it in fast saves us money every day. Also, if a guy's planning another order, we can quickly check to see if he's paid his last bill. If he's in the 30-day column, we won't sell to him."

Making the weekly payroll for his close to 150 hourly field workers is another area where the computer saves Rodriguez both time and money. "Imagine what it would be like to make a payroll for 150 people on Friday afternoon," he says. "We only have two girls in the office, and Margaret [his wife] helps. We would need

***“Just about anybody who
is a full-time farmer, someone with
more than average acreage, can
afford a computer.”***

at least four people. By hand, it would take many, many hours.” The high turnover in South Florida farm-workers also complicates book-keeping. “We issue 900 W2s at the end of the year,” Rodriguez adds.

Working with the computer was frustrating, at first. “But it was also very rewarding,” Rodriguez says. “I remember the first time the [U.S. Department of Labor] Wage and Hour officers came to audit us. I brought out these big binders full of printouts, set them down on the table, and said ‘Here it is.’ The inspector said, ‘We’ll look at it because we have to, but we won’t find anything because anyone who’s willing to put his payroll records into a computer isn’t going to cheat. What we worry about is the type who says, I don’t have any records.’ It was a relief to get those guys out of there in an hour, instead of having them hanging around for a week. That was worth about half of the \$22,000 the computer cost.”

Pesticide watchdog

“Now we’re doing everything with it, inventory control, and even cost analysis on pesticides, which can cost \$400 to \$800 an acre,” he adds. “You can grow many crops for a lot less than that. We used to take our \$300,000 annual pesticide bill and divide it by the number of acres to figure out costs. But that wasn’t a true figure. Let’s say a crop in farm number six received a lot of rain and we had to go on a four-day spray schedule, instead of an eight- or nine-day schedule. Now we can figure out the cost for any field and know exactly where our money’s going.”

With an annual gross farm income of from \$2.5 million to \$5 million, depending on the weather and market, Rodriguez adds that he just can’t afford to be without the detailed, up-to-date information his computer provides.

For David Roehm, computer access to the latest grain market information translated into a quick \$3000

profit. Roehm is one of a test group of farmers watching price swings at the Chicago Board of Trade through the Farm Bureau/Pro Farmer satellite-linked marketing service. Using TRS-80s and Apples, and inputting cost information three times a day, the group monitors various crops. When the price of wheat suddenly took a 60 cent-a-bushel upswing earlier this year, Roehm quickly sold his 100 acres of 50-bushel wheat. “That’s something I probably would not have done without that information,” he says.

The tractor of choice

While most farmers and agribusinessmen say existing software generally leaves a lot to be desired, some solid advances *are* being made. “Texas A&M, for example, has a good machinery cost estimator program for the TRS-80, a detailed analysis of tractors matched with various pieces of equipment,” says Jimmy Dodson, who farms 3000 acres of cotton and grain sorghum with his father in Corpus Christi, Texas. “We had to decide whether to buy a four-wheel drive tractor or buy two smaller tractors. With the help of this program, we figured out that considering fuel efficiency, depreciation and repairs, it was about 30 cents an acre cheaper with the four-wheel drive vehicle. It was very easy to decide to stick with four-wheel drive.” Dodson has used computerized analysis to buy pesticides and fertilizers, and to decide when to sell his grain.

“I bought a TRS-80 Model I, Level I with 4k when it first came out,” he adds. “A friend and I wanted to go together on a combine and we wrote a program for custom combining. It enabled us to go ahead and be able to sleep better at night after we bought the machine, and we made a heck of a profit.”

Dodson has since loaned his Radio Shack outfit to his nephews for their high-school work, while he shops around for the right computer system

for his farm. “It was a lot of fun,” he says of the Radio Shack equipment, “but to update it to business applications wouldn’t be worth it.”

For the past six months, Dodson has had a chance to work firsthand with a new Vector Graphic (Thousand Oaks, Calif.) computer and a TI 810 printer while doing his book-keeping at his local co-op. Before buying the Vector Graphic machine, the co-op used an IBM mainframe computer service in Lubbock. For his own use, he’s eyeing Apple and Radio Shack hardware.

“A personal computer really does help,” he says. “A high percentage of farmers don’t have adequate records, and an even higher percentage don’t have a breakdown on their various farm enterprises. But with everything down in a computer, you can see which ones are doing best for you. I think just about anybody who is a full-time farmer, someone with more than average acreage, can afford to have one.”

But, again, the big hang up, he says, is good software. Some accounting software—Texas A&M’s Micro Farm Accounting System, for example—needs to be simplified, he feels. The system requires a solid accounting and computer background.

“As soon as we get a little better software out, it will be a big help,” he adds. “The big problem for most farmers now is surviving for the next couple of years. A lot of farmers are good managers, but with a few bad weather years and low farm prices, it’s hit a lot of people real hard.”

A new ‘Green Acres’

Nick Fagan has 400 acres in Victoria County, Texas, but low farm prices probably don’t worry him as much as they do his friend Dodson. That’s because Fagan isn’t really a farmer. A CPA who subleases his pastureland to his father and brother and sometimes harvests a few hundred tons of hay, Fagan fits some people’s
(continued on page 129)

Picture This— And Do It Yourself

Managers are turning away from corporate art departments and outside vendors for chart-making and are doing the graphing on their own

by Elisabeth Bayle

In the beginning—in 1979—there was Tiny Troll. A spin-off from an MIT mainframe program called Troll, it was the first known graphics program written for the personal computer. By today's standards, Tiny Troll was primitive—basically, an efficient analyzer of data with limited graphing capability. But those pioneers who dabbled with the program remember it fondly and with wide-eyed wonder. "Tiny Troll was magical," says Allen Sneider, a partner at Laventhol and Horwath, the Boston-based accounting firm.

Tiny Troll was indeed the ground-breaker. But magical or not, it pales by comparison with the graphics software for the personal computer that

has followed it—and the software expected in the next few years.

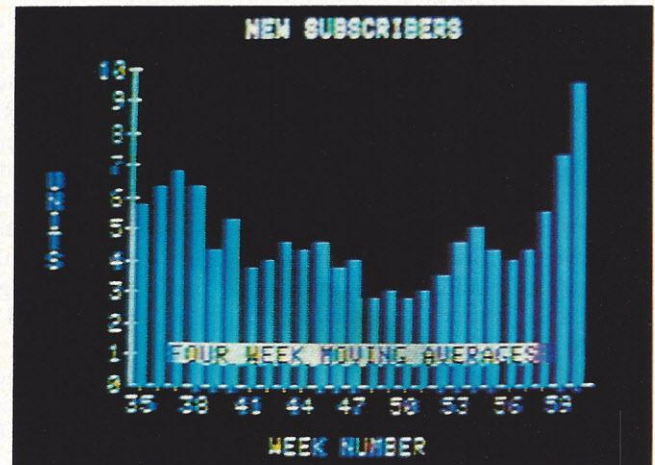
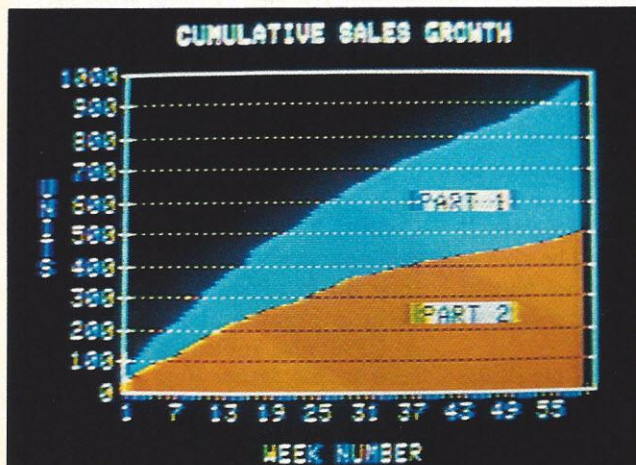
The process of creating graphics electronically on the personal computer—taking computerized data and transforming them into a pictorial representation such as a chart or graph—is still in its infancy. But business managers are already lauding its value. To them, a graph can demonstrate dramatically, in a visual way, the words and numbers used in a written report; the graph can show relationships, trends and comparisons among related data; it can clarify essential points. And as graphing becomes easier for and more available to the personal computers perched on these managers' desks, it provides them with yet another tool with which to conquer the corporate jungle.

The experts watching these man-

agers and taking the pulse of the software suppliers in this field are especially optimistic about the market's potential. Listen to Frank Gens, a senior analyst at the Yankee Group (Boston, Mass.): "By 1985, personal computers will account for \$662 million, or 19 percent, of the \$3.3 billion business graphics hardware market." By the same year, he adds, 80 percent of all personal computers will have graphics software packages available.

The Apple computer line has, since its introduction, prided itself on strong color display capabilities and the ease with which it can dump graphics to printers. And because of that, many of the graphics software and peripheral suppliers have concentrated their offerings on these machines.

The most basic graphics software



"As computerized graphing becomes easier, it gives managers another tool with which to conquer the corporate jungle."

packages are called charting programs. A charting program takes information and text from either a data base file or direct user input, and creates an assortment of visual displays such as pie charts, bar graphs or axis graphs. Some charting programs allow the user to watch the graphic grow on his computer screen, while others are specifically designed only for drawing the chart on a plotter or printer.

The best-selling program of this type is VisiPlot, the graphics companion to the VisiCalc spreadsheet, which served in many ways as the precursor to the current rash of charting packages now emerging for personal computers. VisiPlot was developed by Mitch Kapor and his Cambridge-based software firm, Micro Finance Systems, which not so coincidentally originated Tiny Troll.

Encouraged by how significantly charting programs have enhanced their graphics power, many business professionals are now turning to another type of graphics—the slide-show package—that greatly enhances the power of their charting programs. Slide-show programs allow the user to choose which of his computerized charts he wants to demonstrate, sequence them, and then set up timed intervals for their projection on the screen. After the slide-show demonstration is or-

ganized, the computer can dump the charts onto multiple video screens in a conference room, for example—or onto a large screen in front of a lecture hall. Slide-show packages also often contain graphic editing and design features, such as fancy typefaces or borders, that are not available in the original charting programs. Among the most popular slide-show programs are Screen Director, The Executive Briefing System (EBS) and the high-priced Softslide.

Get to the point

Ron Goldfarb is a manager of office automation for the Pratt & Whitney Aircraft Group, a division of United Technologies Corp. (Hartford, Conn.), which employs about 30,000 people. His job is to develop a microprocessor-based office of the future for the Pratt and Whitney division. He reports his progress to management using graphics generated by VisiPlot on an Apple II Plus with 64k and two disk drives. "Graphics gets you to the point you're trying to make much quicker than 28 pounds of printout from the DP guy," he says. "Senior management doesn't want to go through a pile of numbers just to find out how we're doing."

Goldfarb uses side-by-side bar graphs to compare financial forecasts with actual performance. VisiPlot is

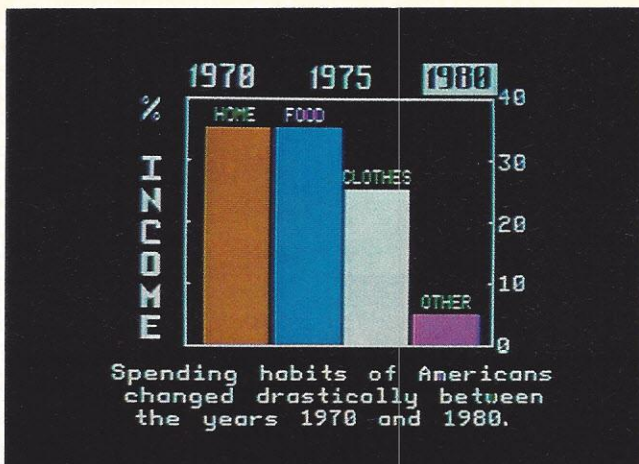
designed primarily to plot data that change over a period of time, and he agrees that it works "perfectly for historical stuff."

Before Pratt & Whitney bought Goldfarb a personal computer and an Epson MX-80 printer with an added high-density graphics feature called Grafrax, graphics were only rarely used in reports and proposals at the firm. He recalls drawing graphs by hand with a rapidograph for internal documents or, worse still, using the company's graphic arts department and waiting a week to get his finished chart back.

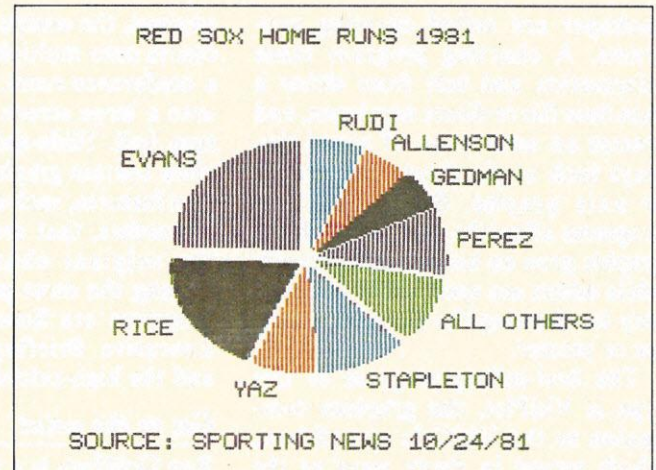
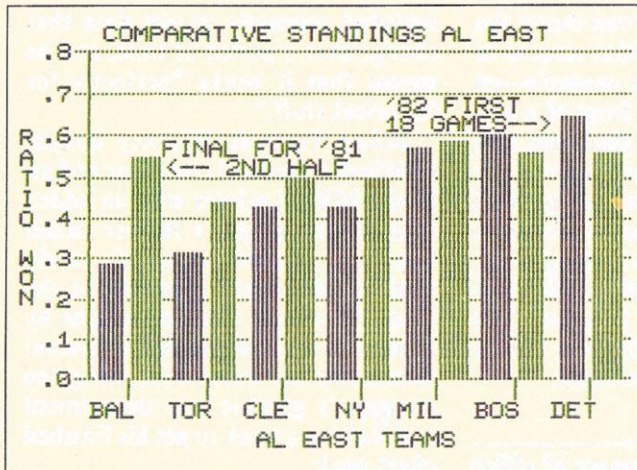
Goldfarb recently added to his graphics capabilities by purchasing the first released copy of the Executive Briefing System slide-show package that Mitch Kapor designed as an extension of VisiPlot. EBS is marketed by Lotus Development Company, the firm Kapor founded after selling VisiPlot to VisiCorp. Introduced in March of this year, EBS offers multiple typefaces for integrating text into your slides.

Goldfarb is completely sold on graphics as a productivity booster. "At first," he says, "I had to hit

Graphics screens from two of the most popular packages on the market. Two graphs developed on Apple Business Graphics are shown on page opposite. Two EBS slide-show software graphics are shown on this page.



PROFESSIONAL/ MANAGERIAL



These four charts that look at the Boston Red Sox from different angles were developed by Standard and Poor's Inc. using Apple Business Graphics (ABG) software. The color graphics shown above were printed on a conventional graphics printer and are lacking the sharp quality available with a graphics plotter. Two examples of the plotter variety are represented in the color graphics below. The Apple Business Graphics package uses a command language rather than a menu, which is used with the VisiPlot package. When creating computerized graphics, many users say that a command language gives them added flexibility because it doesn't limit them to a short list of menu choices. Others users, though, find the command language fairly difficult to learn at first, and sometimes it is complicated to remember.

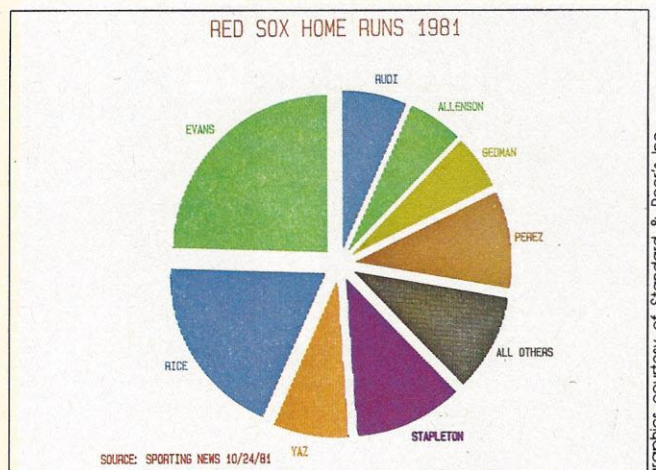
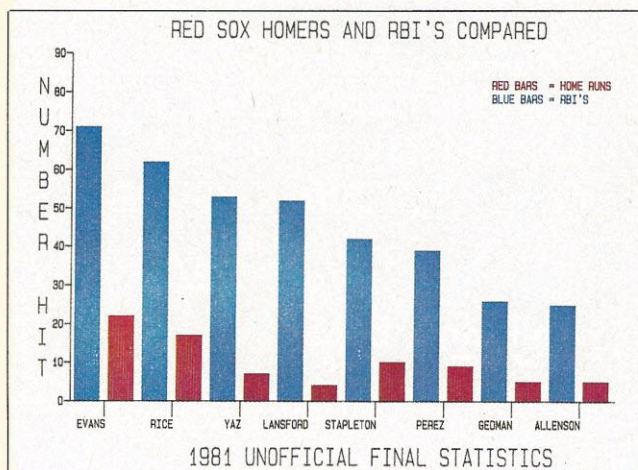
people over the head with a 2 by 4 to get them to work with these graphic programs, but now they love it. People come in at 6 a.m. to use the computers—normal starting time is 8 a.m. Our professional bean counters are saying we shouldn't buy these systems when sales are bad. But that's exactly when you should buy it."

A sales manager at Procter & Gamble (Cincinnati, Ohio) also praises the variety of fonts available on EBS and uses the package to cut down on some of the outside artwork, typesetting and printing previously used in sales presentations. While Pratt and Whitney doesn't take advantage of EBS's "true color fonts"

("we're a black-and-white company," Goldfarb explains) Procter & Gamble does, using mostly color graphics printing by interfacing an Apple II Plus to an IDS Prism Printer and getting paper and transparency copies from a Xerox color copier. Having already tried hobbyist graphic programs like Zoom Grafix and Higher Text, managers at the firm are pleased with EBS's ability to do text editing on the screen and to drive a color printer adequately.

Numbers in, graphics out

The Procter & Gamble sales manager refuses to divulge specific graphics applications so as not "educate the competition." But Allen



***"Graphics gets you to the point
you're trying to make much quicker
than 28 pounds of printout from
the DP department."***

Sneider of Laventhol & Horwath was not so close-mouthed about the advantages of using graphics in his business. He cites the example of an elaborate financial projection he recently completed for a company that manufactures a product synthesized from the hydrocarbon polypropylene.

"When we finished fine-tuning the projection," Sneider says, "we developed graphs using VisiPlot that demonstrated the results very clearly. This could take the form of a graph displaying a sales matrix; a pie chart of products available; bar charts showing sales, gross profit and general and administrative expenses; or a line graph with total sales, certain expenses and units."

The 'gimme' philosophy

With an Apple II (96k with two drives) interfaced to a Centronics black-and-white dot-matrix printer and an IDS Prism, Sneider adds, "the graphic quality is more than acceptable, and it's reliable. You put the data in in numbers or words, and you get the same data out in graphics." He contrasts this with manual graphics work, which must be carefully proofed at all stages of production. Another advantage of using the Apple, he continues, is that "as the financial projections change, redoing the graphs only requires editing the data which were input into the computer."

Sneider stresses, though, that "graphics accompany numbers in a report; they do not replace numbers." If Sneider had a graphics genie on his desk, he'd wish for more elaborate charting capabilities with increased provisions for adding labeling and textual notes. He would also wish for the printer interface to be incorporated into the graphics program itself, rather than being a separate piece of software. But he characterizes these dreams as "the 'gimme, gimme, gimme' philosophy" pervading personal computing these days. "Whatever you

get," he says, "you want more."

The growth of the graphics market appears to be paralleling a general upswing in graphic literacy—the ability to comprehend and communicate accurately through images—and a downswing in textual literacy. In many of the print media, whether in advertising or editorial layout or report documentation, the staid written word is increasingly taking a backseat to the flashiness of graphics. George Maniscalco, a vice president at Standard and Poor's Corporation who has become attached to computerized graphics, blames this shift on television. "A major change took place when people began to watch TV," he says. "People are now tuned to integrating information through their eyes. It's easier to deal with images than to digest words or numbers. We're becoming a very visually oriented culture."

Maniscalco, with a 64k Apple II driving an IDS 560 wide-carriage printer, has graduated up through programs like Apple Plot (which he characterizes as "ponderous" and "too limited") to a combination of VisiPlot, Apple Business Graphics, Screen Director slide show (Business and Professional Software's competitor to the Executive Briefing System) and E-Z Draw. He says that VisiPlot, for instance, is the easiest for plotting time series such as weekly sales information, whereas Apple Business Graphics is excellent for creating a "snapshot" of one point in time, such as how the population feels about something at one polling date.

Maniscalco adds, though, that "being facile in one program doesn't help you in another" because they tend to operate differently. Apple Business Graphics, for instance, has a command language rather than a menu like VisiPlot. This adds flexibility in formatting, since the user is not limited to a short list of menu choices, but even ABG's developers concede that the command language

GRAPHICS BUYERS' GUIDE

Apple Computer Inc.
Cupertino, CA 95134
(408) 946-9000
Apple Business Graphics, \$199.50
CIRCLE 400

Bridge Computer Co.
Division of Sea Data Corp.
Newton, MA 02158
CIRCLE 401

Business & Professional Software, Inc.
Cambridge, MA 02142
(617) 491-3377
Screen Director, \$150 for Apple II, \$250
for Apple III
CIRCLE 402

Decision Resources
Westport, CT 06880
(203) 222-1974
Chart-Master, \$375
CIRCLE 403

Ferox Microsystems Inc.
Arlington, VA 22209
(703) 841-0800
GraphPower, \$299 for two-pen plotter, \$495
for four and eight-pen plotter
CIRCLE 404

Hewlett-Packard
General Systems Division
Cupertino, CA 95014
(408) 735-1550
Graphics/125 for HP 125, \$200
CIRCLE 405

Hewlett-Packard
Personal Computer Division
Corvallis, OR 97330
(503) 757-2000
Graphics Presentation Pac for HP-87, \$250
CIRCLE 406

Lifeboat Associates
New York, NY 10028
(212) 860-0300
Graftalk, \$450
CIRCLE 407

Lotus Development Company
Cambridge, MA 02139
(617) 492-7171
Executive Briefing System, \$199
CIRCLE 408

Microware Associates, Inc.
New York, NY 10022
(212) 308-9593
Superplot, \$150
CIRCLE 409

North Star Computers, Inc.
San Leandro, CA 94577
(415) 357-8500
North Star Advantage, \$3999 for Professional
Configuration: Monochrome display, dual
floppy disks, 64k
CIRCLE 410

Softside Systems, Inc.
Pound Ridge, NY 10576
(914) 764-4207
Softside, \$5000 per single copy, \$15,000
for internal use license
CIRCLE 411

Software Publishing Corp.
Mountain View, CA 94043
(415) 962-8910
PFS: Graph, \$125
CIRCLE 412

Vector Graphic Inc.
Thousand Oaks, CA 91320
(805) 499-5831
AccuChart, \$295
CIRCLE 413

VisiCorp
San Jose, CA 95134
(408) 946-9000
VisiPlot, \$199.50
CIRCLE 414

"The process of creating graphics on a personal computer is still in its infancy, but business managers are already lauding its value."

is more difficult to learn initially. As Maniscalco also found, it can be frustrating when you haven't used the program in a while and suddenly find you've forgotten the commands that were set into it.

Standard & Poor's does a host of mail and telephone surveys, the results of which, until recently, were communicated to management through overhead transparencies drawn from the research by a secretary or an assistant. Now the computerized slide show Screen Director is used instead in presentations.

Text is added to the graphics with E-Z Draw, a graphics text writing program, since Screen Director is considerably more limited than Executive Briefing System in its choice of fonts, its ability to edit images created on another program, and in its drawing capability.

Spawning ambitions

A pioneering spirit that led him to experiment with programs that had only been on the market a few weeks (ABG and Screen Director) has spawned ambitions in Maniscalco to use one day animated 3-D computerized graphics, rather than slides.

Softslide, the Rolls Royce of presentation programs, does include animation, but before you get too excited, you'd better consider the price tag: \$5000 for a copy to run on your Apple, as opposed to the \$200 range of the graphics packages mentioned so far. Feature for feature, Softslide does both more and less than slide show programs like Executive Briefing System and Screen Director; it can only create slides from ApplePlot charts, for example. But it is notable for its approach: It combines a presentation system with rolling title generation, charting routines, animation routines and a show system, all in one package.

At this spring's Applefest in Boston, Dan Bricklin, father of VisiCalc, emphasized that new personal-

computer software must establish "a balance between imitating the old and creating the new." He described the aforementioned slide-show programs as "copying the old—transporting what's available in another medium to the personal computer."

Dr. Howard Rubin, a professor of computer science at Hunter College in New York and creator of Softslide, agrees with Bricklin that the next generation of software must create new ways of doing things. Says Rubin, "We're not trying to come up with another way to do what you can do now; we're trying to provide a new way to make business presentations."

The Metropolitan Life Insurance Company, a \$400 billion company with headquarters in New York, was a test site for Softslide when it first became available in late 1981. The Met's experience thus provides some perspective on just where this kind of product fits into big-business needs.

Robert Linn, the company's senior corporate audio-visual consultant, estimates that he produces some 200,000 slides per year in-house for multimedia shows, sales conventions, client presentations and the like. He has Softslide running on a 64k Apple II and two drives, and uses an Epson MX-80 printer to make black-and-white hard copy for reference only. Linn's use of the program emphasizes live presentation, not a hard-copy record of the graphics. Softslide's piece de resistance is its ability to splice videotape, film, off-air broadcast and interactive computer programs so that they all fit into normal slide-show presentations. That means that in a high-level meeting with an important client, amid the graphics explanation of benefits available with certain types of insurance, Linn can, through Softslide, call up the firm's mainframe, demonstrate how that client's dental or hospitalization claims are being handled, and come up with a complete picture of the account.

Linn says, though, it's the ani-

mation effects available with Softslide that he prizes most—such as having a trend line crawl up to the next point continuously, rather than a separate image, or using a rolling title, whereby text can zoom in from any direction and lock into place on the screen. "Motion holds people's attention," he says. "It becomes more normal and natural to watch, comparable to effects on television. People have grown accustomed to motion when they're watching a presentation, though they may not be aware of that."

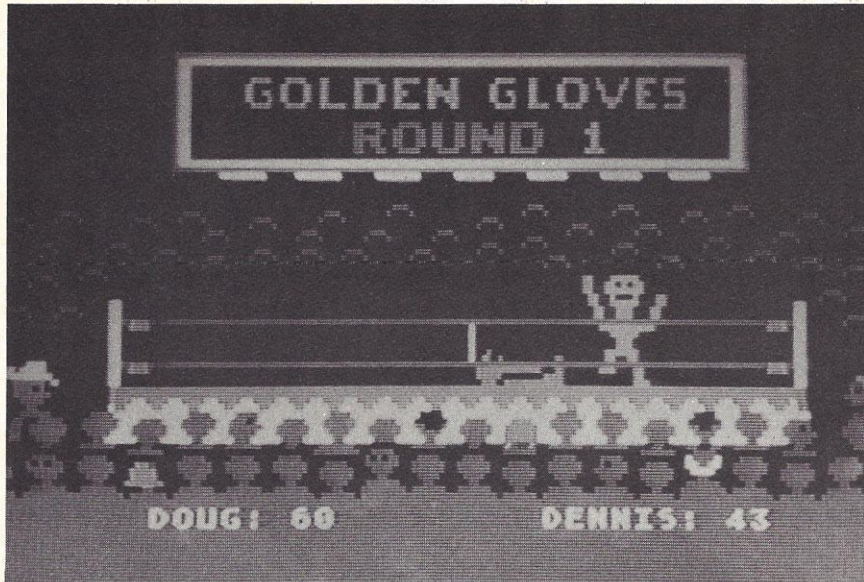
The Softslide Linn uses is topped off by a \$100,000 GE video projector that can project a 20-foot-square viewing surface from 120 feet, plus a \$70,000 processing rack to convert the Apple signal into broadcast timing and thereby enhance the color. Obviously, such a system is not for the faint of heart or financially burdened. But, equally obvious, some firms are willing to spend the money to make a point. "The art of communication to me," says Linn, "is being able to take something that's boring or difficult and make it palatable, so that people can absorb it quickly. You don't have access to them or their brains for very long."

Back to the future

One of the main issues that the computer graphics field will be confronting head-on in the near future is the necessity for so-called "device-independent" software. These are programs that enable the personal-computer owner to use the same software package to run any of the new extraordinary graphics peripherals that have come out recently. Business and Professional Software is moving in this direction with its Printer/Plotter Installation Kit (PIK), which allows Apple Business Graphics to interface with an Electrohome Supercolor board, a Hewlett-Packard 7470A high-resolution plotter, and various other glitzy devices

(continued on page 58)

ARTWORX SCORES ANOTHER TECHNICAL KNOCKOUT.



Scene from **GOLDEN GLOVES**

HODGE PODGE: by Marsha Meredith

(Atari and Apple)

NOW AVAILABLE FOR ATARI!!!! This captivating program is a marvelous learning device for children from 18 months to 6 years. HODGE PODGE consists of many cartoons, animation and songs which appear when any key on the computer is depressed. A must for any family containing young children.

PRICE \$19.95 diskette

BETA FIGHTER: by Douglas McFarland (Atari, 16K)

See who will be the ace gunner in this action game set on a spectacular Martian landscape. BETA FIGHTER can be played with one or two players and uses player/missile graphics and delightful sound effects.

PRICE \$16.95 cassette \$20.95 diskette

DRAWPIC: by Dennis Zander (Atari 16K)

DRAWPIC provides the user with an unbelievably easy way to create screens in graphics modes 3-7. Just sit back with your joystick and use POINT PLOT, DRAW LINE, RUBBER BAND fill and COLOR SET to create beautiful images on your Atari. Full or partial screen images are saved as string data in the program and can be instantly recalled and combined into new images using machine language subroutines. These graphic images can be easily incorporated into your own programs. The images of HODGE PODGE and the landscape of BETA FIGHTER were made using DRAWPIC.

PRICE \$29.95 cassette \$33.95 diskette

ROCKET RAIDERS by Richard Petersen (Atari 24K)

Defend your asteroid base against pulsar bombs, rockets, lasers, and the dreaded "stealth saucer" as aliens attempt to penetrate your protective force field. Precise target sighting allows you to fire at the enemy using magnetic impulse missiles to help protect your colony and its vital structures.

PRICE \$19.95 cassette \$23.95 diskette

FOREST FIRE TWO: by Richard Petersen (Atari 24K)

FOREST FIRE has been enhanced and now offers a two player mode for head to head competition to see who can survive, suffer the least damage and put their fire out first. User input now determines landscape, wind and weather conditions, offering limitless game variation. FOREST FIRE's excellent color graphics have been made even better, turning your computer into a super-detailed fire scanner.

PRICE \$16.95 cassette \$20.95 diskette

FORM LETTER SYSTEM: (Atari, North Star and Apple)

This is the ideal program for creating personalized form letters! FLS employs a simple-to-use text editor for producing fully justified letters. Addresses are stored in a separate file and are automatically inserted into your form letter along with a personalized salutation. Both letter files and address files are compatible with ARTWORX MAIL LIST 3.0 and TEXT EDITOR programs.

PRICE \$39.95 diskette

PILOT: by Michael Piro (Atari, 16K)

Pilot your small airplane to a successful landing using both joysticks to control throttle and attack angle. PILOT produces a true perspective rendition of the runway, which is constantly changing. Select from two levels of pilot proficiency.

PRICE \$16.95 cassette \$20.95 diskette

TEXT EDITOR: (Atari and North Star)

This program is very "user friendly" yet employs all essential features needed for serious text editing with minimal memory requirements. Features include common sense operation, two different justification techniques, automatic line centering and straightforward text merging and manipulation. TEXT EDITOR files are compatible with ARTWORX FORM LETTER SYSTEM.

PRICE \$39.95 diskette

MAIL LIST 3.0: (Atari, Apple and North Star)

The very popular MAIL LIST 2.2 has now been upgraded. Version 3.0 offers enhanced editing capabilities to complement the many other features which have made this program so popular. MAIL LIST is unique in its ability to store a maximum number of addresses on one diskette (typically between 1200 and 2500 names). Entries can be retrieved by name, keyword(s) or by zip codes. They can be written to a printer or to another file for complete file management. The program produces 1, 2 or 3-up address labels and will sort by zip code (5 or 9 digits) or alphabetically (by last name). Files are easily merged and MAIL LIST will even find and delete duplicate entries! The address files created with MAIL LIST are completely compatible with ARTWORX FORM LETTER SYSTEM.

PRICE \$49.95 diskette

THE VAULTS OF ZURICH: by Felix and Greg Herlihy

(Atari, 24K, PET)

Zurich is the banking capital of the world. The rich and powerful deposit their wealth in its famed impregnable vaults. But you, as a master thief, have dared to undertake the boldest heist of the century. You will journey down a maze of corridors and vaults, eluding the most sophisticated security system in the world. Your goal is to reach the Chairman's Chamber to steal the most treasured possession of all: THE OPEC OIL DEEDS!

PRICE \$21.95 cassette \$25.95 diskette

BRIDGE 2.0 by Arthur Walsh (Atari (24K), Apple

TRS-80, PET, North Star and CP/M (MBASIC) systems)

Rated #1 by Creative Computing, BRIDGE 2.0 is the only program that allows you to both bid for the contract and play out the hand (on defense or offense). Interesting hands may be replayed using the "duplicate" bridge feature. This is certainly an ideal way to finally learn to play bridge or to get into a game when no other (human) players are available.

PRICE \$17.95 cassette \$21.95 diskette

ENCOUNTER AT QUESTAR IV: by Douglas McFarland

(Atari, 24K)

As helmsman of Rikar starship, you must defend Questar Sector IV from the dreaded Zentarians. Using your plasma beam, hyperspace engines and wits to avoid Zentarian mines and death phasers, you struggle to stay alive. This BASIC/Assembly level program has super sound, full player missile graphics and real time action.

PRICE \$21.95 cassette \$25.95 diskette

NEW PROGRAMS!

GOLDEN GLOVES: by Douglas Evans (Atari 24K)

Use your joystick to jab, block and duck as each player attempts to land the knockout punch. This unique real-time program brings all of the excitement of ringside to your Atari. GOLDEN GLOVES is a one or two-player game, or you can be a spectator as the computer controls both fighters.

PRICE \$22.95 cassette \$26.95 diskette

CRAZITACK: by Peter Adams (Atari 16K)

The Crazies are attacking us and the only defenses are three MX bases. Missiles can be launched singly or in a salvo, but it is doomsday when you run out of missiles.

PRICE \$17.95 cassette \$21.95 diskette

DOMINATION: by Alan Newman (Atari 24K)

Between one and six players compete for power via economic, diplomatic and military means in this award-winning game. You must make decisions quickly, exercise skillful hand-eye coordination, out-guess your opponents and cope with random events.

PRICE \$17.95 cassette \$21.95 diskette

POKER TOURNEY: by Edward Grau

(Atari 32K, Northstar)

You are entered in a high stakes Draw Poker Tournament facing six opponents including Lake-wood Louie, Shifty Pete and Dapper Dan. Each has his own style of play and of bluffing. POKER TOURNEY utilizes the Joker, has true table stakes play and each hand is played based on pot odds. The Atari version's graphics and sound are superb of course (programmed by Jerry White) making POKER TOURNEY the class program of its type.

PRICE \$18.95 cassette \$22.95 diskette

HAZARD RUN: by Dennis Zander (Atari, 16K)

The sheriff has spotted you and you must make the treacherous run through Crooked Canyon past Bryan's Pond to the jump at Hazard Creek and safety. You can even put the joystick-controlled GEE LEE car up on two wheels to make it through some tight spots. A lead foot is not always the answer as you dodge trees, rocks and chickens in this nerve-racking game. HAZARD RUN employs full use of player/missile graphics, re-defined characters and fine scrolling techniques to provide loads of fast action and visual excitement.

PRICE \$27.95 cassette \$31.95 diskette

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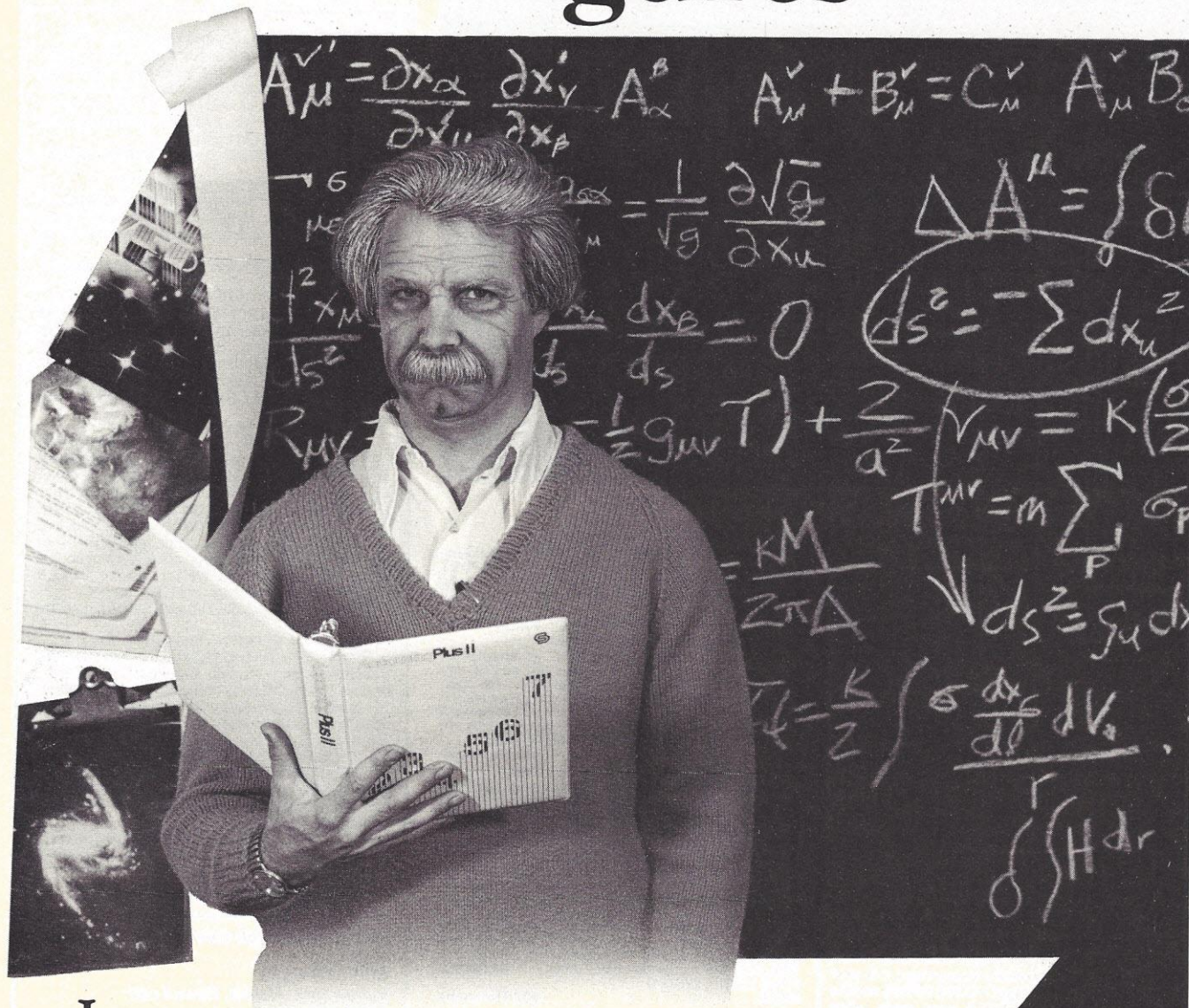
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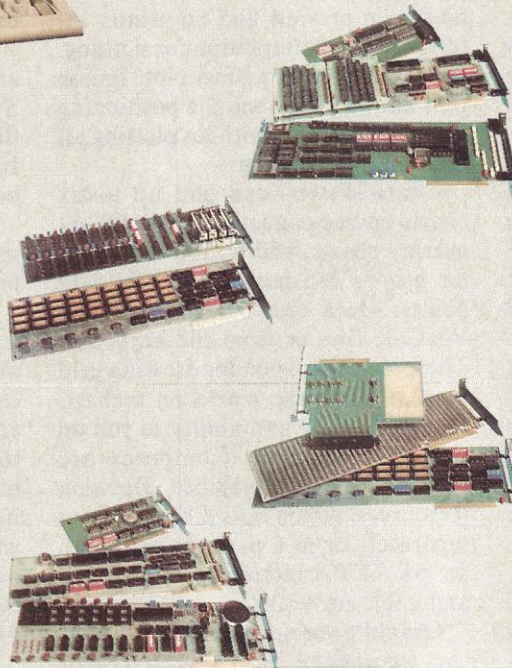
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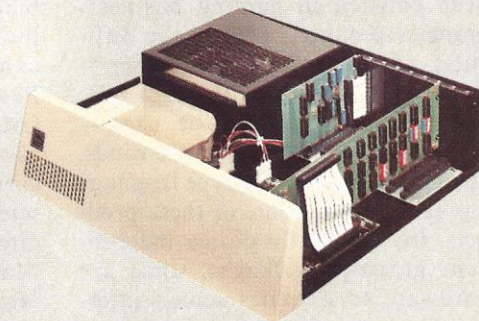
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CIRCLE 18

“By 1985, 80 percent of all personal-computer lines will have graphics software packages available for them.”

PICTURE THIS

(continued from page 54)

that suit your mood. There is also ongoing talk about setting CP/M as the standard operating system, making software transferable from one machine to another.

But there's more to graphics life than just VisiPlot and Apple Business Graphics, and these days you can create graphics on machines other than the Apple. The arduous part, though, is figuring out which software runs on which machine, with which interfaces, to produce the charts and graphs you need.

Some things to remember

Before buying anything, though, you should get a demonstration, read the documentation and talk to users of the product. Most importantly, don't just look at the printed output and assume that the program will give you what you want. Find out what it took to create that chart. For example, ads for the HP 7470A pen plotter show solid pie charts in several colors. These take a long time to plot and necessitate changing pens. If you want to produce 50 pie charts at once, this will matter to you.

Also, there are few, if any, ways to determine what a product does solely from its name. Every possible permutation and combination of the words chart, graph and plot have been enlisted in naming business-graphics products. Due to the difficulty of trademarking a name—words that are part of the public domain cannot easily be used—English has been thrown to the winds, and GrafTalk. Plotpak type language has taken hold. Some of these products are essentially device independent graphics packages, some are hardware to graphics screen interfaces, some are printer/plotter drivers, and others are menu-driven software systems that include interfaces to a graphics screen and printer or plotter. Consequently, careful scrutiny is advised.

With all that in mind, here are some notes on some of the new, newer and newest products available for a broad range of personal computers.

Chart-Master, perhaps the oldest of the new, was introduced in September 1981 and runs on the Apple II and Apple III.

A menu-driven program, it will produce high-resolution color graphics on an HP pen plotter. However, the version available at present has no screen preview and no printer interface. It's plotter output or nothing. However, there is a "fast plot" option that allows you to see the positioning of graph elements without plotting all the text and shading.

Chart-Master, can plot up to six charts on one page, though it will not overlay charts, and its line and scatter graphs can have up to 600 data points. Data can be entered from VisiCalc files or from the keyboard. There is no provision for drawing grid lines or doing the marks on a chart. Screen preview and ability to run on the IBM Personal Computer are planned by the developer, Decision Resources, which sells Chart-Master separately or in a package deal with an HP 7470A plotter, interface card and cable for \$2000.

GraphPower started out as a plotter interface for Micro-DSS/Finance, a financial modeling package with some screen graphics capability published by Addison-Wesley Publishing Company for \$1500. It can read DSS/F files or UCSD Pascal files but not DOS files. GraphPower is now being marketed as a package in its own right, but the current version on the Apple II has no screen preview; its output must go directly to the plotter, as does Chart-Master's. It was introduced in November 1981, and this year will see an announcement of an IBM Personal Computer version that will have screen preview and drive an Epson black-and-white printer. New versions for the Apple III and the TRS-80 are also planned.

GraphPower can put up to four graphs on a page with 260 data points and up to eight variables per chart. Overlay capability and grids are available, as are various text sizes and text slant, although type styles are very limited. It can't do scatter or area charts or horizontal bars, but it offers stacked bar charts and exploded pies, which are not available in some other programs. This menu-driven package requires 64k and two disk drives.

PFS:Graph runs on the Apple II and is the latest in the Personal Filing System family, so it takes PFS data files, as well as VisiCalc DIF (Data Interchange Format) files and keyboard data entry. Introduced in May 1982, "Graph," as it's called, is menu-driven and can produce line, pie or bar charts on the screen.

Just about everything, except your data, is input through a pre-selected menu value (scaling, shading or color, etc.), but not all of these are alterable. While you can overlay up to four graphs, each one can only have 36 data points, and text is limited to a small number of characters with little flexibility as to their size or orientation. Graph supports Silentype or Epson black-and-white printers and the HP7470A plotter.

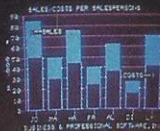
Combining features

Superplot was announced for the Apple III in February 1982. It is also available on the IBM Personal Computer. It is designed to produce high-resolution color line, bar, pie and scatter plots on a graphics screen, with output to several popular printers. At this writing, only scanty information on the product is available, with no price as yet established for the IBM version. It's noteworthy that Superplot takes a stab at combining an element now mostly available otherwise only in separate packages: a slide show-feature is incorporated into the plotting software. Up to four overlays are permitted on each chart.

(continued on page 64)

Screen Director

Screen Director™ retrieves and displays any standard image file on your Apple's video monitor, large screen TV or color printer. For only \$150, Screen Director™ gives you a filmmaker's finesse in boardroom presentations, management briefings and demonstrations for clients.



With Screen Director™ you can scroll forwards and backwards through any color displays, with dissolves or cuts from one image to the next — all at the touch of two buttons. You can even enhance your **Apple Business Graphics** with title slides in a variety of fonts and colors.

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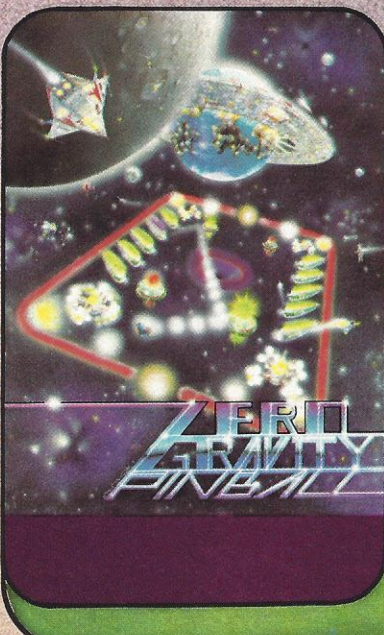
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August 1982 PERSONAL COMPUTING 63

PROFESSIONAL/ MANAGERIAL

PICTURE THIS

(continued from page 58)

Data can be entered from the keyboard or from VisiCalc files.

Accuchart, nee Chartpak, was first released in May of 1981, and was renamed in August 1981 due to a trademark conflict. Developed on the Vector Graphic System B, it is a CP/M based program that can run on any CP/M-based machine with the right disk format, such as the Zenith, Heath and Xerox 820. It is part of the Vector Professional Series, an integrated business software library that runs on all Vector Graphic personal computers. There is no screen preview and no color capability in the software, which is designed to print charts directly on a letter-quality printer.

Any kind of program that starts with those kinds of limitations, but wants to stay in the market, soon must address enhancements which offer more flexibility; thus an interface to the IDS Prism printer is contemplated, and the package's authors are watching for the development of a board to allow screen preview for the S-100 bus machines. The program can produce four kinds of bar charts, a pie chart and an X-Y graph, all of which can have up to five text lines of 36 data points each. Text is obviously limited to the font capability of the printer.

Hewlett-Packard graphics software offerings are confusing, since there are different graphics options on all of the several different series of HP personal computers. You can, however, be sure that the interface between the HP computer's graphics program and the HP plotter will work. For the uninitiated, it goes something like this: The HP-85 personal computer, introduced in 1980, has more or less been surpassed by the HP-87, introduced this spring with larger memory, disk drives, a larger display and CP/M.

While the 85 had limited graphics, the 87 boasts a "Graphics Presen-

tation Pac" that interfaces to the HP7470A plotter. The display has a resolution of 544 x 240 pixels, but no color. But now along comes the HP 125, dubbed "The Personal Office Computer" and "The Business Assistant," jumping into the action as a desktop workstation for managers and administrators. For that computer, Graphics/125 produces the normal line, bar and pie charts from keyboard input, VisiCalc/125 files or row/column ASCII data files. It also produces text "slides." But the only output is HP plotter hard copy; there is no screen preview available.

Language-driven graphics

GrafTalk is an interactive graphics command language package developed by the Redding Group Inc. in Connecticut but distributed and supported by Lifeboat Associates in New York City. It became available in April of this year and runs on CP/M and CP/M-compatible personal computers only. Since GrafTalk is so new, it is still being tweaked to run on the IBM Personal Computer, the DEC VT-80, and the IDS Prism Printer, among other popular output devices. The graphics program will read ASCII data files and contains its own editor. A draw capability and interface to joystick or light pen are handy, but unusual features. Because it is language driven, the computer graphics user may find that the time it takes to learn his way around the program could be significantly greater than for the less versatile menu-driven programs.

The North Star Advantage is referred to as "an interactive integrated graphics computer" and is unique in its marketing approach because it offers a free business graphics package to lure buyers. North Star evidently thinks that graphics will sell computers, since the charting software comes with every Advantage; it's part of the system diskette along with a

(continued on page 150)

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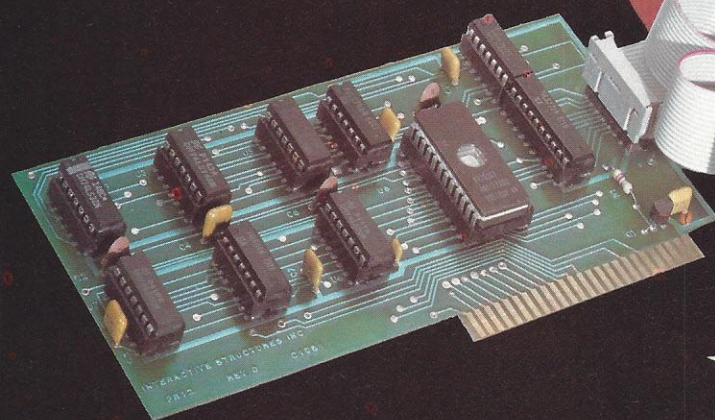
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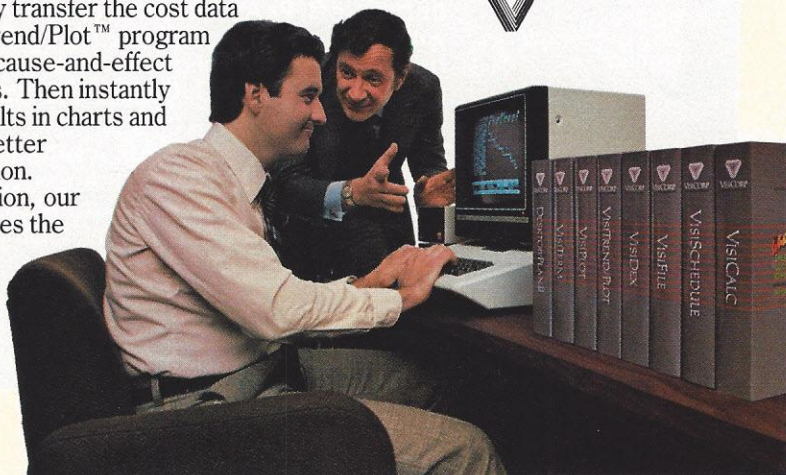
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Data Security: Paranoia Or Prescience?

Data security is a hot issue in personal computing. With users becoming aware of how much their data might be worth to someone else, they're devising schemes to keep it secure

by Theresa Engstrom

"The larger companies have guns to protect them," says John McKeever. "We're a small company, so all we have is this." He points to his TRS-80 Model II.

A personal computer for protection? It may sound like futuristic whimsy, but like McKeever, president of his own security firm, more and more personal-computer users are mixing security and computing. As they do, they are quickly realizing that a computer can be a vulnerable place to store the keys to the castle.

At McKeever's company, Mid-South Security Systems (Fayetteville, Ark.), the computer stores vital information about the homes of customers, including the combinations to safe deposit boxes, the locations of jewels and other valuables, and floor plans. All of this information is scrambled in a code, however. McKeever sleeps a lot easier knowing that any would-be invader, without knowing the secret key to the data, would receive a meaningless stream of characters from the computer.

"We felt we needed something like this encryption system," says McKeever. "If someone ever got into the computer, it would be disastrous. It's important that the layouts of the homes do not get out, and this provides an uncrackable kind of security."

Theresa Engstrom, former editor of the New England Business Magazine, is a writer from Sharon, Mass.

In McKeever's business, security and privacy are life-and-death problems. But he is not the only small businessman who has realized how much his computerized files mean to him—and how much they could be worth to others.

As increased memory storage has expanded the capacity of the personal computer, businessmen have begun entrusting their systems with sensi-

uncovered one of the hottest issues in personal computing.

Edward Keegan, owner of a retail/wholesale hardware store in Webster, Mass., is typical of the businessmen who anticipate a need for computer security sometime soon. Keegan has six entrusted employees, including his mother and brother. Computer theft is not a problem now, he says, but his password system is a hedge against future problems.

Key to the computer

Keegan's Wang 2200 SVP single terminal with 32k memory and a four megabyte Winchester disk drive has password protection, the most common security system for personal computers. A password is literally a key to the computer. Unless the user enters the correct word, or number combination, the software will not operate.

"We weren't aware of these types of problems—data pilferage and the rest," Keegan says. "But we found out after we bought the system that it is a problem, and it's getting bigger."

For example, there are endless possibilities for someone intent on manipulating the books, he says. But with the password system, Keegan logs in with a code word that is not visible on the screen, and is then ready to work. For someone to learn the code, Keegan says, "they would have to be looking over my shoulder." If the password gets out—for exam-

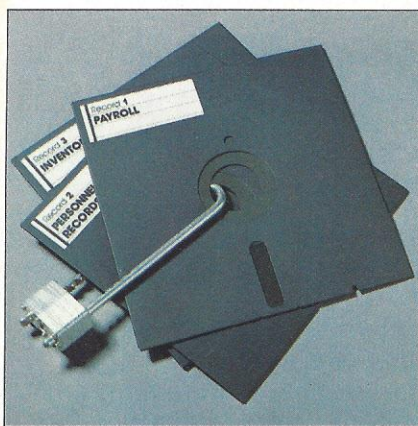


Photo by George B. Fry III

tive information—like payrolls—that could hurt them if it fell into the wrong hands. These users are learning a fact of life that banks, the federal government and other mainframe users have known for years. Just as they bolt the doors at night, businessmen must safeguard their computer files with technological "locks and keys."

Whether you believe they are paranoid or prescient, these users have

ple, if an employee operator leaves the firm—generating a new password is “like getting a new key made,” says Keegan.

Until recently, personal-computer security was not considered to be an issue that was either relevant or even critical. Stories abounded about mainframe computer crimes, such as bank embezzlements, or international espionage and data theft. The personal computer, with its reputation as a tool for small-business owners and professionals working either alone or with a few trusted employees, was thought to be too portable and too flexible to require security precautions. Indeed, to some, security for personal computers almost seems to be a contradiction in terms.

“Computing is the distribution of information,” says James A. Schweitzer, a manager of systems se-

curity technology at Xerox in Bridgeport, Conn., “especially when we’re talking about personal computers. And security is the restriction of that information.” But despite his sentiments, it is Schweitzer’s job to worry about security in the personal computers used at Xerox.

“People tell me, ‘I don’t have anything I wouldn’t want anybody to see,’” Schweitzer says. “But if they really thought about it, they might not say that. What about job evaluations? What about letters about someone else? Would you want that person to see them? If the data have no value, what are the data doing on a computer?”

Trends toward privacy

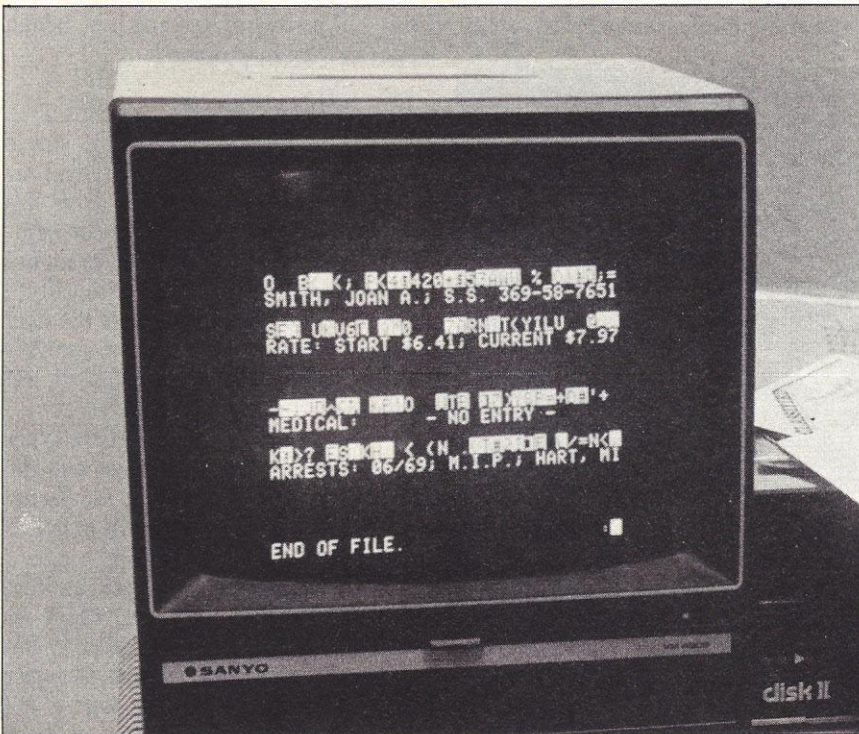
Even though it may not be universally perceived, many executive personal-computer users agree with Schweitzer that privacy and security

are problems. “Security is very definitely an issue for businessmen,” says one publishing company president. “For example, small businessmen were once reluctant to do their own payrolls because they didn’t want someone in the company to see how much money everybody was making. However, payrolls are now often handled in-house with a computer. I certainly would not want my figures getting into the wrong hands,” he says.

In fact, two important trends in personal computing indicate that businessmen who worry about securing the vital data in their units may be ahead of their time.

The move toward more memory-storage capacity, or mass storage, is perhaps the most compelling factor that has prompted concern about security. Floppy disks are no longer adequate for many businesses, says Jack McGrath, editor of *SATN*, a journal for VisiCalc users published by Software Arts Inc. in Cambridge, Mass. As soon as an owner becomes comfortable with his computer, McGrath says, he demands more memory. An increasing number of manufacturers are now offering hard-disk options, and software companies are rushing to the market with hard disks for Apple and Radio Shack computers (see “Understanding Mass Storage: What’s in It for You?” *Personal Computing*, February 1982). And as users turn to hard disks, which can hold massive amounts of sensitive information, their thoughts turn increasingly to privacy.

A blossoming computer literacy rate is also causing concern. “Right now, most employees don’t have the computer knowledge to even get into a machine,” says Don Taylor, manager of the Computer Shop in Boston. But, he adds, this ignorance will not be a barrier for long. The growing popularity and increasing “friendliness” of personal computers means that eventually, if a firm has six employees, five will have at least a



An encrypted Apple text file is being decoded using the security package from Passage Research. This software mixes up bits and bytes stored on floppy disks when one of over 100 billion “cipher” keys is activated by the input of a user’s code word. The package’s manual describes simple to advanced encryptions.

“Any would-be invader, without a password, would receive a meaningless stream of characters from the computer.”

passing acquaintance with computers. At that point, the business owner who fails to secure his data might just as well scatter all of his vital files carelessly on his desk.

What's the password?

Only recently has some of the technology designed to protect large mainframe data bases filtered down to the personal-computer level. Password protection is the most common system, even though most experts agree it affords only “casual protection” against computer invasion. However, passwords do offer small businessmen a cloak of privacy to shield their data from curious employees.

Some manufacturers sell personal computers with password protection built in—an option that is not always appreciated by the buyer. But most users say they are glad to have the option, even if at first they don't activate it.

Hank Beisheim, part-owner of a garment business in San Raphael, Calif., says he has no need for the password protection that is standard on the Winchester hard disk he bought from Broderbund Software Inc. “We have two shops,” Beisheim explains. “My partner does the payroll for one, and I do it for the other. There's nobody else there to protect it from. But if we wanted to delegate some of the work, the password would be good to have. Or if we wanted to protect the books from prying eyes, at that point, we could just go in and put in a password.”

The most sensitive subject for small-business owners and professionals is payroll, experts agree. Particularly in a small shop, carelessly handled payroll information can wreak havoc with employee morale. Knowing that it is a sensitive area, many software makers have added password systems to their payroll programs. VisiCorp, the publisher of VisiCalc, for instance, plans to market a payroll data filing system later

this year for IBM computers that will support password protection.

But passwords may not be enough protection. “Passwords offer casual protection,” says Terry Feldt, president of Passage Research, an encryption company in San Diego that makes a scrambling disk for Apple files. “But a password or passkey system doesn't really protect you if the penetrator has any determination at all.”

Son of the “secret codes”

The alternative might be encryption, or the coding of messages, or files, by translating them into a language based on a mathematical formula. Only by using a password key can a user begin to unscramble the data. Today's codes might be called the descendants of the “secret codes” used during World War II. In fact, the primary uses of codes have been for the military, and until recently, the federal government seemed to think it had a monopoly on coding. But today's widespread computer uses, and the banking community's growing reliance on funds transfer, has made cryptology a hot topic.

In 1977, the federal government published the Data Encryption Standard, which provided a basic algorithm for encoding non-classified data. Since then, it seems that most of the mathematical geniuses in the country have been bent on building a tougher formula.

Feldt says the “which is tougher” arguments are irrelevant. His formula, he argues, which will encrypt any file created under the Apple DOS 3.3, is devious and foolproof enough for any personal-computer user. Feldt's software is marketed for the Apple.

For about \$40, Passage Research will sell the customer a disk that contains the encryption software and a 24-page manual that explains how to use it. The user can then encrypt his files with a nine-character key. (“Type in something only you can re-

member,” Feldt suggests, “like the name of a high-school teacher you hated.”) If someone tried to run the files without knowing the encryption key, the information would come out as a stream of nonsense characters.

People dealing with personnel records were immediately interested in Feldt's product and in other encoding schemes. James Slater, a biology professor at Crowder College in Neosho, Mo., has two computers, including an Apple II Plus with 48k, two disk drives, two printers, a color monitor and a green phosphorous screen. He uses his computers for statistical simulation of classroom problems. Slater would like to use them for student records and personnel data, but he doesn't dare, he says. “I have had problems with students playing with the computer,” he says. “And I've left disks lying around. I have a real fear of leaving sensitive information lying around. One reason I wouldn't put student records on the computer is because students could get into it. After all, I wouldn't leave my grade book lying around, if I could help it.”

Thwart the curious

Slater plans to begin using the encryption device from Passage Research to encrypt his files. Then he could leave his disk in his office, or lying around, with impunity, safe in the knowledge that no student could read the files should he get overly curious.

To thwart really determined interlopers, there is public-key encryption. It works on the same principal as Passage Research's coding system, except that a user has two coding formulas—one that he alone knows, a secret key to unravel messages sent to him, and a “public key” that communicants use to send him messages. The keys are complementary, and only when used together can they unscramble a computerized message.

Standard Software Corp. of America, in Randolph, Mass., sells a public

BUSINESS

"No computer user, no matter how hard he tries, is ever safe from government spying."

key encryption system designed for CPM-based personal computers. While company officials concede that basic password systems are sufficient for most small-users' purposes, they maintain that public key encryption will be increasingly valuable in years to come for communications, such as for sending telexes. In addition, mail order businesses are turning to this method to protect proprietary mailing lists. "He can encrypt the list," says John Shagouri, Standard's marketing director, "and if it gets into the wrong hands no one can make sense of it." Standard calls its device The Protector.

Another, more expensive, solution is to alter the hardware. Cryptext, a Seattle company, is marketing an en-

ryption "black box" that can be attached to an Apple II. For \$800, a customer receives an interface to the hardware, an encryption unit, a software diskette, a manual and cables.

The box will scramble data, just as Passage Research's encryption disk does, but its marketers claim that Cryptext's scrambling possibilities are 2 to the 80th power—or more combinations than there are electrons in the universe.

Hardware and software

Charles Merritt, who wrote the software for Standard's public key encryption, feels that no computer user is ever safe from government spying. And the firm's marketing men concede that at this point many

personal-computer users are buying encryption devices just "to play with them."

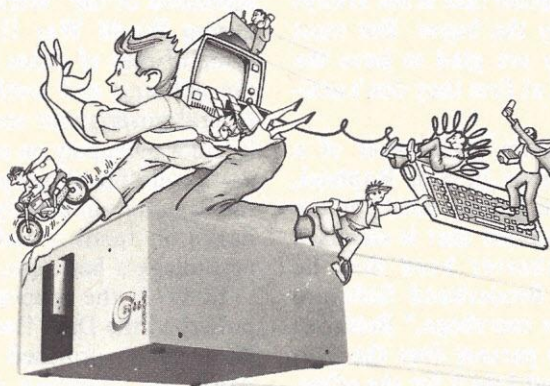
Ultimately, the security solution will probably be a combination of hardware and software technology. For instance, a password could be created that changes from day to day in a pattern known only to the user. Or, data could be encoded by the computer's hardware as the data go on the disk.

And for those seriously concerned with security, Schweitzer of Xerox contends that physical security is the first line of defense. Lock the computer in a room, he says. Give only trusted employees a key. Within your computer files lie the keys to your business.



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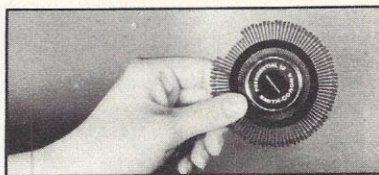
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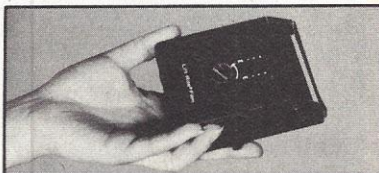
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Computers Control The Instruments Of Science

From research in medical labs to measuring air pollution to monitoring Mt. St. Helens, computers are providing behind-the-scenes muscle

by James E. House

In the past two years we've seen an explosion in the use of computers around here," says Dr. Kirk C. Aune, a biochemist at the Baylor School of Medicine in Houston, Texas. On the face of it there is nothing remarkable about that statement. Laboratories wired with mainframes, processing information at inhuman speeds, have already become a central part of the current scientific scene. But Aune was speaking about a more recent, but suddenly persistent, phenomenon: the presence of personal computers on the scientific front, where they are doing everything from monitoring instruments to controlling experimental processes.

One of the central question marks about personal computers that has apparently kept them from widespread scientific use has been dispelled recently, opening the door for their acceptance in this community. For a long time, researchers assumed personal computers were simply not hardy enough to put up with the laboratory pace, but this view has changed. "We've run round-the-clock applications on various projects," says Dr. Paul Weiss, for 10 years an electronics engineer at Baylor, "and we've never had any problems with our personal-computer hardware." Dr. Luke Rose, a researcher at Integral BioMedical En-

gineering, a Sacramento, Calif., software customizing house, adds: "We had one project on which we had a personal computer running day and night, nonstop, up to four weeks at a time—and that was with one of the early Commodore PET machines."

Process control

Although hardware endurance may be less a problem than many people have believed, other factors as well have kept personal computers from being used for process control. Limitations in memory size, speed and computing power have been significant obstacles. These limits are being overcome by using 12- or 16-bit machines instead of 8-bit ones, by per-

sonal computers that have much greater memory capacity and more sophisticated operating systems, and by those that present simpler interfacing devices. Indeed, some of the personal computers now on the market were designed specifically for the engineer, scientist and researcher.

The new research in genes and microbiology, for instance, wouldn't have been stopped by the absence of small computers, but neither would it have proceeded as far as it has.

Researchers are hooked on the use of computers in the minute world of cells and their constituents. "We have analyzed sequences of amino acids, and we have located their controlling genes by a manual process in the past," comments Dr. Michael Hunkapiller, senior research fellow in biology at the California Institute of Technology in Pasadena. "In fact," he continues, "we have synthesized genes or DNA (deoxynucleic acid, the chemical that carries the genetic code) strands by a manual process as well—we sometimes call it cloning genes. But the whole procedure is very labor-intensive. Since it involves so much repetition, it's also easy to make a mistake. By using computers, we can eliminate the careless mistakes and also economize significantly."

Hunkapiller shows a taste for understatement. An academic or a commercial lab, for example, can now produce a string of DNA—say, 14 nucleotides long—in less than a day



The HP-85 personal computer is used by the U.S. Geological Survey to monitor volcanic activity at Mount St. Helens. By taking data from radio signals coming from the mountain, the computer has helped researchers predict eruptions accurately to within 30 minutes.

James House is a free-lance business and science writer and educator based in the San Diego area.

Researchers around computers
were not hard enough to put up
with the laboratory pace. But this
view has changed.

“Personal computers are making an appearance in the physical sciences by monitoring the gigantic world of mountains and volcanoes.”



photo © 1982 Gary Braasch

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“Researchers assumed computers were not hardy enough to put up with the laboratory pace. But this view has changed.”

for \$2 to \$3. Before the procedure was computer-controlled, the price tag was \$2000 to \$3000 and took weeks or months.

Equally important, the biochemists and geneticists can now produce hundreds of different kinds of substances in quantities previously unheard of. Many of these occur in infinitesimal amounts in the human body; many are also now prized by doctors or medical researchers. For instance, labs now manufacture human insulin, interferon (a possible anti-cancer agent), growth hormones and pain opiates, all in quantities that make them commercially viable.

In this new technology two machines stand out—the protein sequencer and the gene synthesizer—and both of them are controlled by personal computers. At Cal Tech, the scientists use a Hewlett-Packard 85 to run the two pieces of equipment and a Hewlett-Packard 1000 to analyze the large amounts of data the sequencer puts out. The latest edition of the sequencer, patented by Cal Tech, sells for \$100,000; the synthesizer, only recently on the market and offered by Applied Bio Systems of Foster City, Calif., goes for \$25,000 to \$50,000. Since the HP-85 sells for approximately \$3500, and the HP 1000 costs about \$12,000, they represent a very small part of the total equipment cost.

Computers in command

Applying the computers wasn't terribly difficult, according to Hunkapiller. "My brother Tim, who is a graduate student here at Cal Tech, used HP interfaces and power relays that ran directly to the computer," he says. "Then we designed the software, and he did the programming."

For both the sequencer and the synthesizer, the computer gives orders for the delivery and removal of reagents to a series of vessels in a certain sequence and in precise amounts. The cycle might have as many as 100 steps and is repeated

several times. Finally, the data are fed out to another, larger computer that performs comparisons and analyses. Throughout the process, the personal computer receives information that tells it that the rest of the system is working mechanically as it should. The full set of procedures in the two machines, naturally, is different, but the application of the computer in both instances is essentially the same.

Are the scientists ready to rest on their laurels now that they've tied the computer into genetic engineering? "Not at all," answers Hunkapiller. "The next project is far more ambitious. We're working on a machine that will allow us to synthesize 20 to 30 compounds simultaneously. In addition, we're going to start work on peptides, which represent an entirely different type of chemistry than we've been doing. In both of these projects, we intend to employ personal computers as controllers."

The scientists at Cal Tech note that there are roughly half a dozen other labs like theirs in the country using personal computers. They also note that cloning genes by a manual process is sometimes feasible. But now they're looking toward a chemistry of complex operations for which no manual equivalent is possible. At this point small computers become indispensable, not simply devices for economizing or relieving scientists and technicians of boring tasks.

The urge to economize has also been the stimulus in several new applications for personal computers in process control at the Baylor School of Medicine. Dr. Weiss has been designing medical support systems. He has two technicians helping him, as well as a machine shop and a plastics lab to manufacture parts and develop molds. In fact, Baylor is one of the few medical schools to build equipment for clinical and research use.

"Dr. DeBakey—the world-famous heart surgeon—is responsible for most of our innovations," says Weiss.

"He heads the department of surgery and believes in a first-class facility. He just gives us an idea of what he wants and then lets us go at it, and in most of our systems we use small computers. Currently we are using Cromemcos, Apples, and a Rockwell AIM-65, plus a PDP-10 mainframe for supporting work. We have over 12 machines at work in this one department."

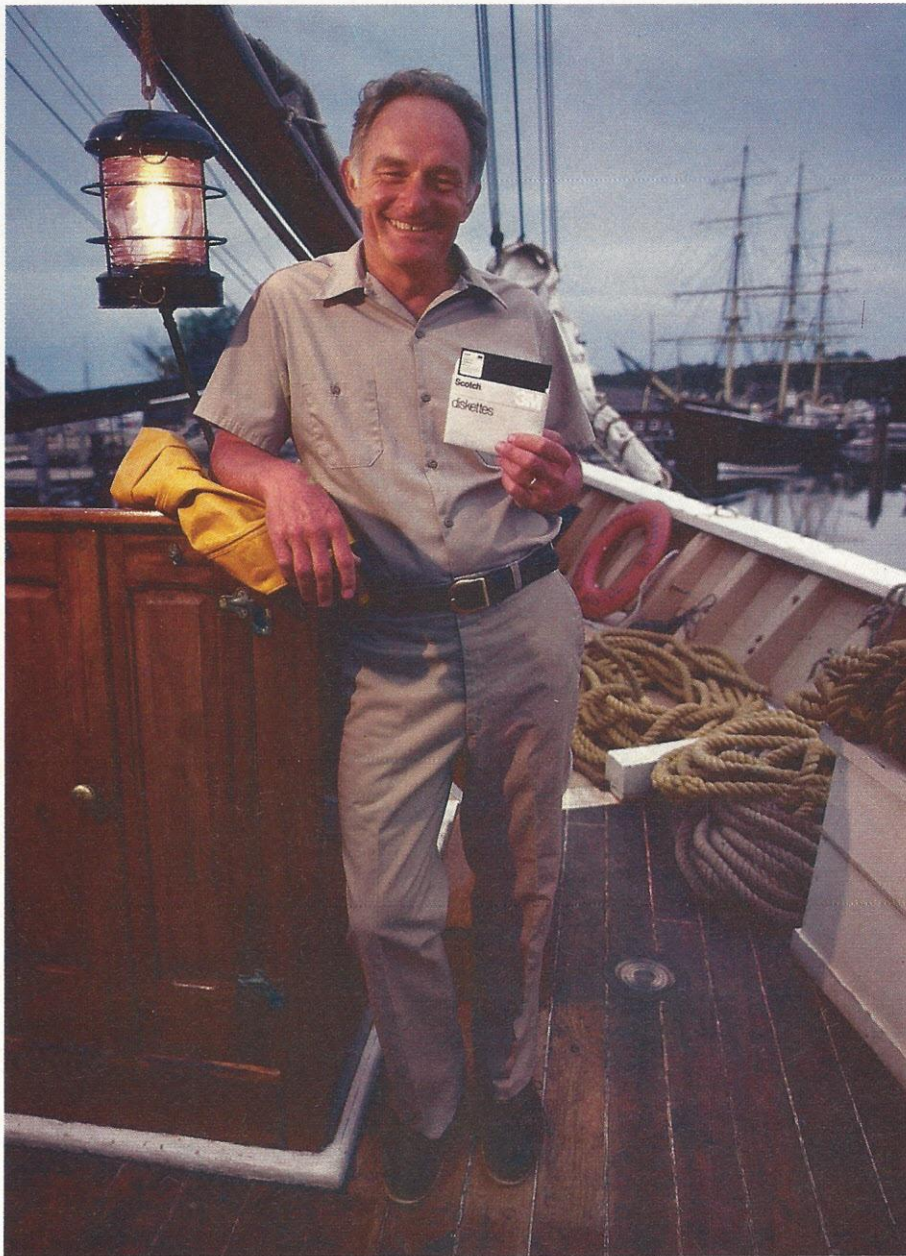
Although Weiss has set up personal computers for nearly everything at Baylor—data acquisition, statistical analysis, word processing, record keeping and process control—his current interest, clearly, is process control. His preference among personal computers is the Cromemco line, especially the System 3, because of its Cromix operating system and versatility in the lab. Like other scientists at Baylor, he finds the machine easy to program and yet powerful enough to control a complex operation.

The only hope

Recently, cutbacks in government support for patients who must have the service of an artificial kidney drew his attention to the problem of kidney dialysis. "Governmental agencies cut monies for these people by up to 20 percent," he says. "What were we going to do? Our only hope was to automate the dialysis process more efficiently, and we did. We employed an STD bus computer from Pro-Log (Monterey, Calif.), a dedicated processor, a CRT from Motorola (Phoenix, Ariz.), and a printer that would print out the results of this program. Then we applied it to the washing of artificial kidneys."

Each time a patient comes in for dialysis, he is connected to a machine that runs his fluids through an artificial kidney in place of his natural one. In the past, the artificial kidney was thrown away after one use. Now, thanks to Weiss' computer, it can be reused up to 10 times at a savings of \$50 each time.

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"It's a totally closed system," Weiss adds. "The operator mounts the kidney on a purifying machine. Then the machine washes it, measures its performance, washes it again, and finally sterilizes it. A printer provides us with the results of the test." The computer controls the entire operation.

And looking for ways to cut down the cost of operations, especially open-heart surgery, Weiss and Dr. DeBakey hit upon the idea of reusing the patient's own blood by speeding up the blood-cleansing process. The fastest cleansing machine on the market could treat 220 cubic centimeters (cc) of blood in 15 minutes—not good enough to keep up with the heart. Weiss' new equipment does 220 cc in two and a half minutes—fast enough to keep the same blood circulating continuously.

It must be an expensive piece of equipment to work that fast, right? "Not at all," insists Weiss. "The old machine cost \$18,000, but mine cost only \$3000 to build. The reason is that the earlier version depends on a technology that is three years old. Mine uses a dedicated CPU and TTL ICs to do the control work. The other day we did open-heart surgery on a patient who, using the old machine, would have taken 27 units of blood. At \$60 a unit, expenses run up fast."

Compress and compute

Since collecting data is simpler in theory than controlling a process, it would seem that computer applications for that purpose would be less taxing and demand less expertise. After all, as a collector, doesn't the computer register, rather than interact? Isn't it primarily a passive, rather than an active, device in this instance? The answer to these questions is, of course, yes. But theory doesn't always prove out in practice—in this case, for two important reasons.

In the first place, collecting data may be extremely difficult if the

number of stations is great and their ordering crucial. Also, problems with interfacing often arise. More importantly, however, the computer is often used to do more than merely collect data. It can perform a series of tasks on data before the scientist sees a printout: scaling, collating, picking out patterns, identifying trends, making charts, drawing graphs. In other words, the computer does something to make the original data more compact and more accessible—it computes and compresses.

Dr. Bruce Barkalow, president of Integral BioMedical Engineering in Sacramento, Calif., offers an example of this type of complicated instrumentation. His company doesn't manufacture or sell hardware; rather it specializes in customizing equipment for university research centers, hospitals and the medical systems industry itself.

"Michigan Technological University," relates Barkalow, "came to us with a problem. The biological sciences department was doing an experiment on hibernators—in this case they were using bats—and the data they were generating with their 10 monitoring devices was so great that it took them months just to collate and make sense of those data. The process of taking all the information off different strip charts was simply too cumbersome."

Essentially, the physiologists wanted each bat to be hooked up to 10 different monitoring devices. There were measurements of oxygen intake, carbon dioxide output, water vapor, calories expended, different temperatures, specific heat and several other items. The idea was to measure the physiological changes that the animal undergoes during hibernation, and so an additional requisite of the system had to be long-term reliability. The experiments were repeated over and over again.

Each of the interfaces with the computer had to be different; some
(continued on page 80)

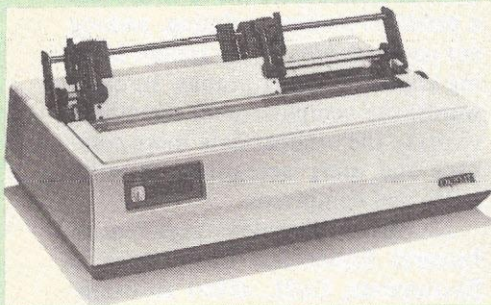
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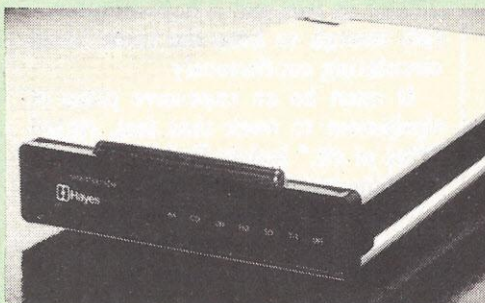
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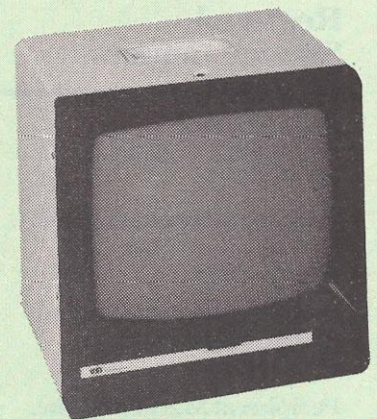
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“Computers are helping in the study of macromolecules because they are able to pose more complex problems.”

INSTRUMENTS OF SCIENCE

(continued from page 77)

of them required considerable ingenuity. Finally, communication links led to a Commodore 2001, which colated and scaled the results. “The oxygen analyzer gave us the most trouble,” explains Barkalow, “because it was a Beckman Model G-2, a self balancing recording potentiometer with no output voltage directly proportional to the reading. We had to mechanically interface it with the recording mechanism with special gears and a high-precision potentiometer. Then we applied a voltage and got an accurate electronic result.”

Barkalow estimates that implementation of the computer-driven system reduced expenses in the experiment by a factor of 10, although he says that none of the figures were given to him by the university. Bats were chosen because their aestivation cycle—their time of hibernation—is usually less than 24 hours. Nevertheless, under the old system more than one person was needed to monitor all the instruments during the 24-hour period. Several people were also required to reduce the strip charts to arithmetic, or quantified, data. After all of these tasks had been finished, the data could be fed into a computer to be charted and analyzed for trends.

There’s a great irony to Barkalow’s success story, however. When the university received the computerized monitoring system, it ran out of money for the experiment.

“Of course, we can’t help with that problem,” he adds, “but it seems that much of what we did in that application will be useful in neonatology—that’s the study of the life cycle of babies in the womb.”

Like Weiss at Baylor, Barkalow has several new projects in mind, and most of them involve personal computers. Barkalow prefers Commodores in his work. One of his planned projects is to employ a VIC-

20 to build a monitoring device for operating rooms and intensive care units that will display vital signs over different periods of time. It will show, for example, an electrocardiogram, two blood pressures (arterial and veinal), temperature, respiration rate, and number of abnormal heartbeats per unit of time.

Every hospital has such a monitoring device in its surgery room or intensive care unit, but most of them show only instantaneous data. In other words, they don’t show trends over a period of time. Neither can they produce different vital signs as a combined reading of a patient’s condition over a period of time. Only the newest and most expensive monitors have those capabilities.

“We want to put a VIC-20 together with a monitor and high-resolution graphics, and possibly with a printer that can copy graphics from the screen, so that hospitals can upgrade their equipment instead of having to pay a large sum to replace it altogether. Without the printer and the software that we’re working on, the base of the system could cost as little as \$1700. Contrast that with at least \$12,000 for a new monitor that can analyze and display trends.”

Into the big world

Engineers like Barkalow and Weiss work on computer applications in the life sciences, where microbiologists and biochemists treat the miniature world of molecules and cells. But there’s another aspect of nature and another scale of subjects altogether different: the physical sciences and the gigantic world of mountains and volcanoes.

Personal computers are making their appearance in this realm as well. The eruption of Mount St. Helens in May 1980 brought volcanoes to the public’s attention in the United States, creating a new awareness of their awesome power. It also brought to everyone’s attention—scientist or otherwise—how little we know about

their cycles of activity. Hopeful of filling some of that void, the U.S. Geological Survey has started using a new monitoring system on Mount St. Helens. Scientists in the lab at Vancouver, Wash., under the guidance of Dr. Daniel Dzurisin, have built a series of tilt meters from which they take readings every 10 minutes, day in and day out.

“We use a HP-85 to collect the data, which comes in from the mountain by radio signal,” says Tom Murray, the technician in charge of programming the computer. “Every 10 minutes the 16 meters in the field radio in and dump their data. The computer stores it on magnetic tape.”

In order to speed up analysis of the data, Murray has programmed the computer so that it will show trends in the tilt, or inflation, of the crater floor. As a predictive device, the computerized tilt meter is very accurate: “Since we’ve put the meters inside the crater, we’ve been able to predict eruptions or explosions accurately to within 30 minutes. We’re so confident of our ability to read the volcano’s cycles now that scientists walk the crater’s floor every day. Usually there are five or six doing different types of tests around the dome, and with our ability to predict within 30 minutes, they now have a warning time that allows them to leave by helicopter well before an eruption.”

Having the meters inside the 1000-foot crater and close to the 600-foot dome that is building up from the floor presents another problem. Whenever matter explodes from the top or oozes from the side of the dome, the instruments are wiped out even though they sit underneath nine-gallon drums.

The HP-85 is attached to the radio receiver in the lab by an RS-232-C interface. A PDP-11/03 is standing by to be plugged into the system at some time in the future. “When we took the data off paper tapes before, we sent it to the Unix-based system at

(continued on page 132)

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CIRCLE 34

One Step Ahead

Word Processing For Personal Computers

It's one of the most common applications for personal computers. Characters are input and full documents are output, with only the clicking of a few function keys

by David Gabel

If you were to ask 15 people in a computer store what they do with their personal computers, chances are that the majority of them would answer that one of their applications is word processing. The frequency of this response is certainly the reason there are so many software packages for word processing on the market today. Almost every software developer and vendor, it seems, has a word-processing package available.

So just what is a word processor? And what is it about them that makes them so popular?

Word processors are software (programs) that turn your personal computer into a machine that accepts and manipulates the written word as it's entered on a keyboard. They make life much easier for those whose main task in life is text manipulation. Common applications for word processing include letter writing (especially form-letter writing), long document writing and mailing-list activities. For the latter, some packages provide you with the ability to access mailing lists directly, while others may require that you buy another program specifically for the mailing-list features.

This report is being written on a personal computer with a word processor—an Apple II Plus with 48k of memory and two disk drives, and

Hayden Software Co.'s Apple PIE word-processing package specially configured to run with the Videx 80-column board.

That hardware and software list should give you a clue right off as to some of the constraints of word processing. First of all, the 48k of memory: While this is a pretty standard memory size these days, what with the price of memory falling as it is, I still can't get a very large document into this computer. Fortunately, the software warns me (by an audible tone and a written message) when the file is getting too big. When that happens, the only recourse is to start a new file for the document that's being worked on. Although 48k sounds like a lot of memory, both the word-processing program and the document being prepared must fit into that space. The longer the program, the less room there is for the document.

The system being used here can handle a 10,000-character document with ease, which is probably more than most people will ever need. But some applications will be constrained by the maximum document size. If that's the case, breaking the document into several files is not a problem, but it is an annoyance.

This system has two disk drives. One drive is an absolute requirement, since the program is available on disk, not tape. In fact, most serious professional software is available on disk. The second drive is a really nice-

to-have feature, but one that could be eliminated. If it is, though, you have to be prepared for some swapping of the program disk and the data disk(s), depending on how much you use the program disk. If the data-entry function of the word processing is to take up most of the time when the package is employed, then disk-swapping won't be cumbersome. But if there's going to be a lot of formatting and printing, you can take up a lot of time removing and inserting disks into a single drive. Again, it's not terrible, but it is an annoyance.

On the wide screen

Finally, the 80-column board, and there's a lot of discussion about this one. Many people will say that you just can't do word processing without an 80-column screen. Certainly, that's true for some applications. But it's probably not a universal truth. If your word-processing application requires that you write only memos that will be circulated to your department in a large corporation, say, then 40 columns (or slightly fewer) will probably be adequate. The same is probably true for strictly personal correspondence. But if you get outside these admittedly limited applications, you'll probably want a wider screen.

What you will almost certainly want, in any event, is a lowercase display. That's the true utility of the boards for Apple IIs—they give the

(continued on page 97)

David Gabel, our editor, can now search and replace whole articles in a matter of minutes.

“Almost every software developer and vendor, it seems, has a word-processing package available.”

WORD-PROCESSING BUYERS' GUIDE

AB COMPUTERS
252 Bethlehem Pike
Colmar, PA 18915
(215)822-7727
Papermate/\$40
all Commodore computers
CIRCLE 420

ADVANCED OPERATING SYSTEMS
450 St. John Rd.
Michigan City, IN 46360
(219)879-4693
CleanSlate/\$79.95
TRS-80 Model I and III
CIRCLE 421

APPLE COMPUTER
10260 Bandy Dr.
Cupertino, CA
(408)996-1010
AppleWriter II, III/\$150, \$225
Apple II and II Plus
CIRCLE 422

ASPEN SOFTWARE
P.O. Box 339-L
Tijeras, NM 87059
(505)281-1634
Writer's Companion/\$179, \$129
CP/M-based systems,
IBM, TRS-80 Models I, II, III
CIRCLE 423

BEAMAN PORTER
Pleasant Ridge Rd.
Harrison, NY 10528
(914)967-3504
PowerText/\$399, \$299, \$199
IBM, Apple II and III
CIRCLE 424

CHARLES MANN & ASSOCIATES
55722 Santa Fe Trail
Yucca Valley, CA 92284
(714)365-718
Docuwriter/\$199.95
Master Text Processor/\$139.95
Personal Text Processor/\$69.95
Apple II Plus
CIRCLE 425

COMMODORE BUSINESS MACHINES
487 Devon Park Rd.
Wayne, PA 19087
(215)687-7750
Wordcraft-80/\$395
Commodore computers
CIRCLE 426

COMPUVIEW PRODUCTS
1955 Pauline Blvd.
Suite 200
Ann Arbor, MI 48103
(313)996-1299
Zedit, IBM, CP/M-based systems
CIRCLE 428

CORVUS SYSTEMS
2029 O'Toole Ave.
San Jose, CA 95131-1375
(408)946-7700
Edward/\$495
CONCEPT
CIRCLE 429

CREATIVE SOFTWARE
201 San Antonio Circle
Mountain View, CA 94040
(415)948-595
PetWord/\$49.95
Pet
CIRCLE 430

CROMEMCO, INC.
280 Bernardo Ave.
Mountain View, CA 94040
(415)964-7400
Writemaster/\$595
Cromemco computers
CIRCLE 431

DAN P. BUNTON
108 Broadmoor Dr.
Little Rock, AR 72204
(501)666-8001
Writer's Rescue/\$80
Apple II and II Plus
CIRCLE 432

DATAMOST
9748 Cozycraft St.
Chatsworth, CA 91311
(213)709-1202
Write-On/\$129.95
IBM Personal Computer
CIRCLE 433

DATEK SYSTEMS
4786 Lee Hwy.
Arlington, VA 22207
(703)243-3770
LetterGo/\$495
North Star Horizon and Advantage
CIRCLE 434

DESIGNER SOFTWARE
3400 Montrose #718
Houston, TX 77006
(713)520-8221
Palantir/\$425
CP/M-based systems
CIRCLE 435

HAYDEN SOFTWARE CO.
0 Suffolk St.
Lowell, MA 01853
(617)937-0200
PieWriter/\$149.95
Apple II Plus
CIRCLE 436

IJG, INC.
1260 West Foothill Blvd.
Upland, CA 91786
(714)946-5805
Electric Pencil/\$89.95
TRS-80 Model I and III
CIRCLE 437

INFOSOFT SYSTEMS
25 Sylvan Rd. S.
Westport, CT 06880
(203)226-8937
WpDaisy/\$425
CP/M-based systems
CIRCLE 438

INFORMATION UNLIMITED SOFTWARE
281 Arlington Ave.
Berkeley, CA 94707
(415)525-452
EasyWriter/\$100
EasyWriter Professional/\$175
EasyWriter II/\$350
Apple II and II Plus,
IBM Personal Computer
CIRCLE 439

LEXISOFT
Box 427
Davis, CA 95616
(916)758-3630
Spellbinder/\$495
CP/M, MP/M, and Oasis-based
systems
CIRCLE 440

LIFETREE SOFTWARE, INC.
177 Webster St.
Suite 342
Monterey, CA 93940
(408)659-3221
Volkswriter/\$195
IBM Personal Computer
CIRCLE 441

LJK ENTERPRISES, INC.
P.O. Box 10827
St. Louis, MO 63129
(314)846-6124
Letter Perfect/\$150
Atari 400/800, Apple II and II Plus
CIRCLE 442

MARK OF THE UNICORN
P.O. Box 423
Arlington, MA 02174
(617)489-1387
The Final Word/\$300
IBM Personal Computer
CIRCLE 443

METASOFT
711 E. Cottonwood
Suite E
Casa Grande, AZ 85222
(602)836-6160
Benchmark 2.0/\$399.95
Benchmark 3.0/\$499.95
CP/M and PC DOS systems
CIRCLE 444

MICROPRO INTERNATIONAL
33 San Pablo Ave.
San Rafael, CA 94903
(415)499-1200
WordStar/\$495, \$375
IBM Personal Computer, Apple II
CIRCLE 445

MUSE SOFTWARE
347 North Charles St.
Baltimore, MD 21201
(301)659-7212
SuperText 40/80/\$175
Apple II Plus
CIRCLE 446

NEC HOME ELECTRONICS, USA
1401 Estes Ave.
Elk Grove Village, IL 60007
(312) 228-5900
NEC Word Processing/\$495
NEC PC-8000
CIRCLE 447

NORTH STAR COMPUTERS
14440 Catalina St.
San Leandro, CA 94577
(415)357-8500
NorthWord/\$199
North Star Horizon and Advantage
CIRCLE 448

ON-LINE SYSTEMS
36575 Mudge Ranch Rd.
Coarsegold, CA 93614
(209)683-6858
The Screenwriter II/\$129.95
Apple II Plus
CIRCLE 449

PEACHTREE SOFTWARE, AN MSA CO.
3445 Peachtree Rd., NE
Atlanta, GA 30326
(404)262-2376
PeachText/\$500
Z80, 8080-based systems
CIRCLE 450

PERFECT SOFTWARE, INC.
1400 Shattuck
Berkeley, CA 94709
(415)974-6661
Perfect Writer/\$389
most CP/M-based systems
CIRCLE 427

PROFESSIONAL SOFTWARE
51 Fremont St.
Needham, MA 02194
(617)444-5224
WordPro I Plus/TBA
WordPro II Plus/\$199.95
WordPro III Plus/\$295
WordPro IV Plus/\$450
WordPro V Plus/\$450
Commodore computers
CIRCLE 451

QUARK ENGINEERING
1433 Williams
Suite 1102
Denver, CO 80218
(303)399-1096
WordJuggler/\$295
Apple III
CIRCLE 452

RACET COMPUTES
1330 N. Glassell
Suite M
Orange, CA 92667
(714)633-680
The Electric Pencil/\$99.95
NEC PC-8000
CIRCLE 453

RADIO SHACK
300 One Tandy Center
Fort Worth, TX 76102
Scriptit/\$99.95
Scriptit 2.0/\$399
Super-Scriptit/\$199
TRS-80 Models I, II, III

SELECT INFORMATION SYSTEMS
919 Sir Francis Drake Blvd.
Kenfield, CA 94904
(415)459-4003
Select The Word Processor/\$595
CPM and MPM-based systems
CIRCLE 454

SOF/SYS, INC.
4306 Upton Ave. S.
Minneapolis, MN 55410
(612)929-7104
The Executive Secretary/\$250
Apple II, IBM Personal Computer
CIRCLE 455

SOFTAPE, ART-SCI, INC.
10432 Burbank Blvd.
North Hollywood, CA 91601
(213)985-5763
Magic Window/\$99.95
Apple II or II Plus
CIRCLE 456

SORCIM
405 Aldo Ave.
Santa Clara, CA 95050
(408)727-7634
SuperWriter/\$395
IBM Personal Computer
CIRCLE 457

STRUCTURED SYSTEMS GROUP, INC.
5204 Claremont
Oakland, CA 94618
(415)547-1567
Word Right/\$500
CP/M, Z80, 8080, 8086 systems
CIRCLE 458

TEXAS INSTRUMENTS, INC.
Customer Relations
P.O. Box 53
Lubbock, TX 79408
(800)858-4565
TI Writer/\$99.95
TI9/4A
CIRCLE 459

VECTOR GRAPHIC
500 North Ventu Park Rd.
Thousand Oaks, CA 91320
(805)499-5831
Memorite III/\$450
Vector computer systems
CIRCLE 460

WESTICO
25 Van Zant St.
Norwalk, CT 06855
(203)853-6880
Word III/\$195
Apple III
CIRCLE 461

(continued)

SPECIAL REPORT

Word-Processing Editing Features

COMPANY/PACKAGE	HYPHENATION	SCROLL FUNCTIONS Vertical	Horizontal	JUMP FEATURES Text Beginning	Text Ending	New Screen/Next Page	Previous Screen	Middle of the Screen	End/Beginning Line	BLOCK FEATURES Copy	Merge	Move	INSERT FEATURES Character	Block	Line	Word
AB COMPUTERS Paper Mate	•	•		•	•	•	•	•		•	•	•	•	•	•	•
ADVANCED OPERATING SYSTEMS Clean Slate		•	•	•	•	•	•		•	•	•	•	•	•	•	•
APPLE COMPUTER Apple-Writer II, III		•	•	•	•	•	•	•		•	•	•	•	•	•	•
ASPEN SOFTWARE Writer's Companion		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
BEAMAN PORTER PowerText-IBM PowerText-Pascal PowerText-Run-Time		• • •	•	• • •	• • •	• • •	• • •	• • •	• • •	• • •	• • •	• • •	• • •	• • •	• • •	• • •
CHARLES MANN & ASSOCIATES Docuwriter Master Text Processor Personal Text Processor		• • •	• • •	• • •	• • •	• • •	• • •	• • •	• • •	• • •	• • •	• • •	• • •	• • •	• • •	• • •
COMMODORE BUSINESS MACHINES Wordcraft-80		•	•	•	•	•	•		•		•	•	•	•	•	•
COMPUVIEW PRODUCTS Zedit		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
CORVUS SYSTEMS Edword		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
CREATIVE SOFTWARE PetWord				•	•					•		•		•	•	
CROMEMCO Writemaster		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
DAN P. BUNTON Writer's Rescue	•	•		•	•	•		•		•	•	•	•	•	•	
DATAMOST Write-On-IBM Write-On-Apple		• •		• •	• •	• •	• •	• •	•	• •	• •	• •	• •	• •	• •	• •
DATEK SYSTEMS LetterGo		•		•	•	•	•		•	•	•	•	•	•	•	
DESIGNER SOFTWARE Palantir		•	•	•	•	•	•		•	•	•	•	•	•	•	•
HAYDEN SOFTWARE PieWriter		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
IUG Electric Pencil		•		•	•	•	•	•	•	•	•	•	•	•	•	•
INFOSOFT WpDaisy	•	•	•	•	•	•	•			•	•	•	•	•	•	•
INFORMATION UNLIMITED SOFTWARE EasyWriter Orig. EasyWriter Prof. EasyWriter II		• • •	• • •	• • •	• • •	• • •	• • •		•	• • •	• • •	• • •	• • •	• • •	• • •	• • •
LEXISOFT Spellbinder	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
LIFETREE Volkswriter		•		•	•	•	•	•	•	•	•	•	•	•	•	•
LJK ENTERPRISES Letter Perfect		•		•	•	•	•		•		•	•	•	•	•	

“Word processors make life much easier for those whose main task in life is text manipulation.”

•	•	•	••	•	•	•	•		••	•	•		•	•	•	•••	••••	•	•	•	•	DELETE FEATURES Words
•	•	•	•••	•	•	•	•	•	••		•	•	•	•	•	•••	••••	•	•	•	•	Line
•	•	•	••	•	•	•	•	•	••		•		•	•	•	•	•••	•	•	•	•	Rest of line
•	•	•	•	•	•	•	•	•	••	•	•	•	•	•	•	•	•••	•	•	•	•	Block
•		•	•	•	•	•	•	•	••	•	•		•	•	•	•	•••	•		•	•	Pages
•	•	•	•••	•	•	•	•	•	••	•	•	•	•	•	•	•••	••••	•	•	•	•	WORD WRAP
•	•	•	••	•	•	•	•	•	•		•	•	•	•	•	•••	••••	•	•	•	•	SCREEN FORMATTING Margins
•	•	•	••	•	•	•	•	•	•		•		•	•	•	•••	••••	•	•	•		Tabs
	•	•	•	•	•		•		•		•			•		•		•		•		Underlining
•	•	•	••	•	•		•	•	•		•	•	•		•	•••	••••	•	•	•		Centering
•	•	•	••	•	•	•	•	•	•		•	•	•	•	•	•••	••••	•	•	•		Page Width/Length
													•						•			SPLIT SCREENS
•	•	•	•••	•	•	•	•	•		•	•		•	•	•	•••	••••		•	•		PARAGRAPH METHODS By Tabs
•	•		••	•		•		•		•	•			•	•	•••	••••				•	By Hitting Return
•		•	•	•	•				••	•	•		•	•	•			•	•	•		By Control Keystroke
•	•	•	•••	•	•	•	•	•	••	•		•	•	•	•	•••	••••	•	•	•		SEARCH AND REPLACE Search Only
•	•	•	•••	•	•	•	•	•	••	•		•	•	•	•	•••	••••	•	•	•		Character Strings
•	•	•			•	•	•	•		•			•	•				•		•		Approximate Strings
•	•	•	•		•	•	•	•	••	•	•		•	•		•••	••••	•	•	•		N Times
•		•	•	•		•	•	•		•			•	•			•••	•	•	•		DELETE BUFFERS
	•	•	••	•	•	•			••	•	•		•	•	•	•••	••••	•	•			BACKUP/CRASH RECOVERY
•	•	•		•		•	•	•	••	•	•		•	•	•	•••	••••	•	•	•		COMMAND/STATUS LINE

SPECIAL REPORT

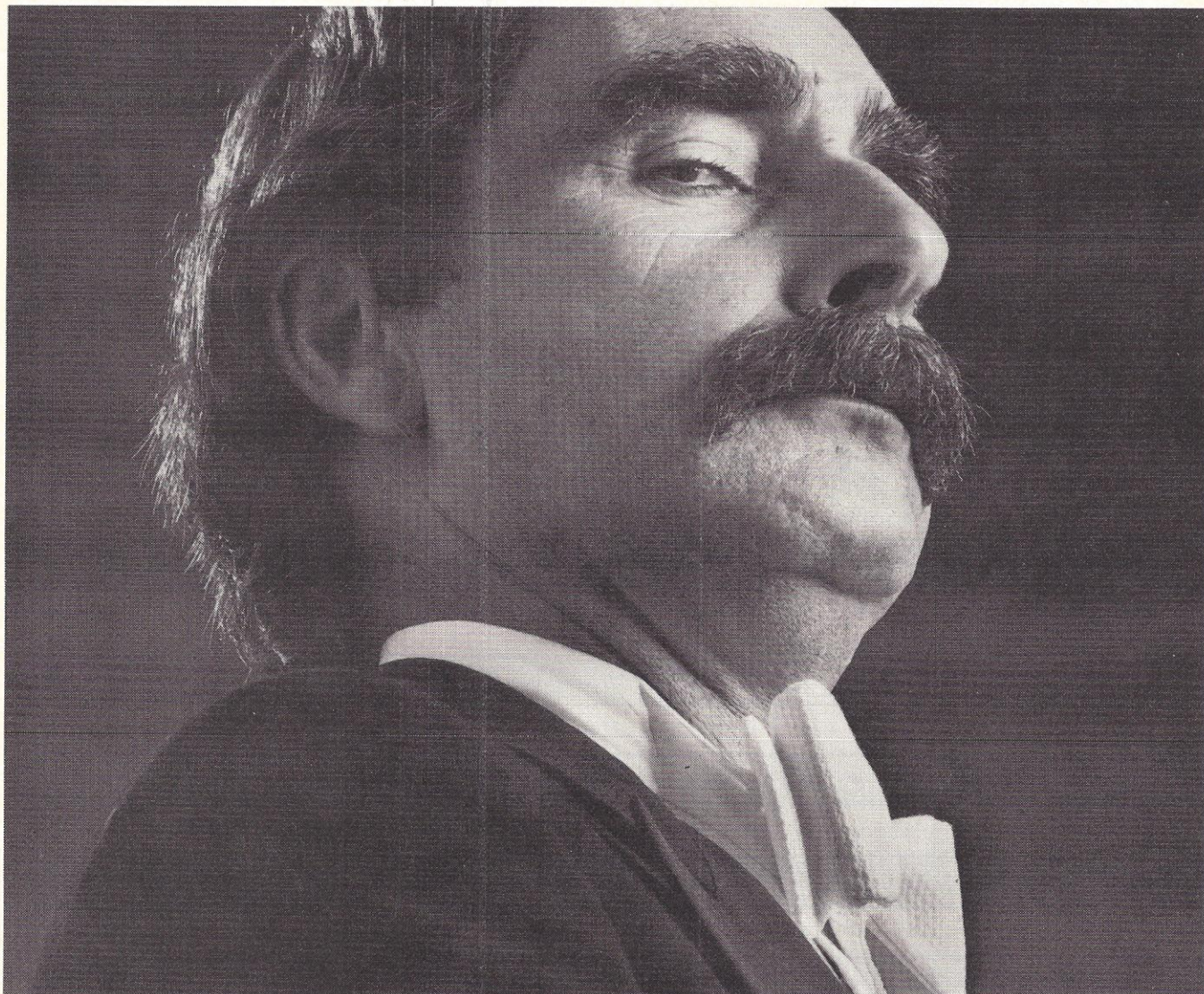
(continued)

WORD-PROCESSING EDITING FEATURES

COMPANY/PACKAGE	HYPHENATION	SCROLL FUNCTIONS Vertical	Horizontal	JUMP FEATURES Text Beginning	Text Ending	New Screen/Next Page	Previous Screen	Middle of the Screen	End/Beginning Line	BLOCK FEATURES Copy	Merge	Move	INSERT FEATURES Character	Block	Line	Word
MARK OF THE UNICORN The Final Word		•		•	•	•	•	•	•	•	•	•	•	•	•	•
METASOFT Benchmark 2.0 Benchmark 3.0	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•
MICROPRO WordStar	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•
MUSE SOFTWARE Super-Text 40/80		•		•	•	•	•	•	•	•	•	•	•	•	•	•
NEC HOME ELECTRONICS USA NEC Word Processing		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
NORTH STAR COMPUTERS North Word		•		•	•		•	•	•	•	•	•	•	•	•	•
ON-LINE SYSTEMS Screenwriter II	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
PEACHTREE SOFTWARE PeachText	•	•		•	•	•			•	•	•	•	•	•	•	•
PERFECT SOFTWARE Perfect Writer	•	•		•	•	•	•	•	•	•	•	•	•	•	•	•
PROFESSIONAL SOFTWARE WordPro I Plus WordPro II Plus WordPro III Plus WordPro IV Plus WordPro V Plus	• • • • •	• • • • •		• • • • •	• • • • •	• • • • •	• • • • •	• • • • •	• • • • •	• • • • •	• • • • •	• • • • •	• • • • •	• • • • •	• • • • •	• • • • •
QUARK ENGINEERING Word Juggler		•		•	•	•	•		•	•	•	•	•	•	•	•
RACET COMPUTES Electric Pencil		•	•	•	•				•	•	•	•	•	•	•	•
RADIO SHACK Scriptit SuperScriptit Scriptit 2.0	• • •	• • •	• • •	• • •	• • •	• • •	• • •		• • •	• • •	• • •	• • •	• • •	• • •	• • •	• • •
SELECT INFORMATION SYSTEMS Select Word Processor		•		•	•	•	•		•	•	•	•	•	•	•	•
SOF/SYS Executive Secretary	•	•		•	•	•	•		•	•	•	•	•	•	•	•
SOFTAPE Magic Window		•	•	•	•	•	•	•	•	•	•	•	•	•	•	
SORCIM SuperWriter		•	•	•	•	•	•		•	•		•	•	•	•	
STRUCTURED SYSTEMS GROUP Word Right		•		•	•	•	•		•	•	•	•	•	•	•	•
TEXAS INSTRUMENTS TI Writer		•	•	•	•	•	•	•		•	•	•	•	•	•	•
VECTOR GRAPHIC Memorite III		•		•	•	•	•	•	•	•	•	•	•	•	•	•
WESTICO WORD III		•		•	•	•	•	•	•	•	•	•	•	•	•	•

“The software warns (by an audible tone and written message) when the file is getting too big.”

[illegible]



A Case For Discrimination.

Discriminating computer users don't want the *best known* word processing software. They want the *best* word processing software.

Hewlett Packard, for instance, spent 9 months comparing 7 microcomputer word processing software systems—including the most popular brands—for distribution with the new HP125 microcomputer.

Hewlett Packard's conclusion: Spellbinder is superior to every other system evaluated.

The reason? Spellbinder's unrivalled ease-of-use and superior capabilities. Spellbinder requires fewer keystrokes for entering and editing text, and provides more flexible printing options without changing the way you enter text. Spellbinder and an inexpensive microcomputer easily rival dedicated word processing systems costing up to *three times* more.

In addition, Spellbinder offers features for mass mailing and for professional legal texts. The price also includes forms handling and "boiler plate" features to store and merge commonly used documents, forms, and paragraphs.

Best of all, Spellbinder's lofty capabilities are available at a very competitive price. In fact, some of the bigger names in word processing packages demand a much higher price, for a package with far fewer features.

Hewlett Packard wouldn't settle for less than Spellbinder. You should be just as discriminating. See your nearest computer dealer for a demonstration of Spellbinder. Or call Lexisoft at (916) 758-3630.

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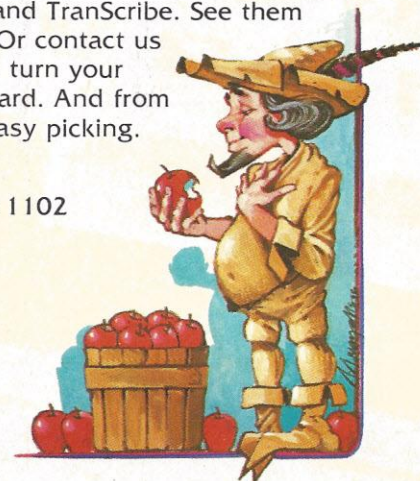
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Finally, there's TranScribe[™]. A spooler designed especially for hard disk drives. TranScribe lets you use other computer functions while you're printing. And it's compatible with most Apple III software. \$125.

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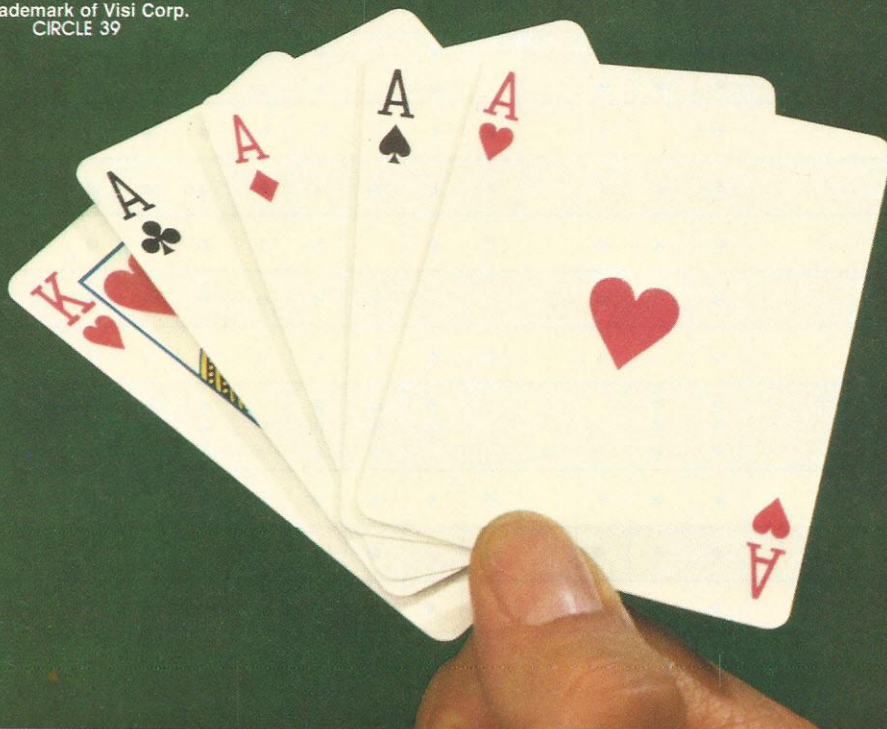
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CIRCLE 39



(continued from page 87)

Word-Processing Printer/Formatting Features

COMPANY/PACKAGE	CONTINUOUS FORMS	MULTIPLE COPIES	ANY PAGE FROM A FILE	SIMULTANEOUS I/O SPOOL	CHANGE VERTICAL PITCH	SPECIAL CHARACTERS	CHANGE FONTS	LINE/FORM FEED	PRINT FROM ANY PAGE	STOP PAGINATION	PAUSE CHARACTER	UNFORMATTED PRINTING	MICRO SPACE SHIFTS	PROPORTIONAL SPACING	JUSTIFICATION Right	Left	Center
AB COMPUTERS Paper Mgtc	•	•	•		•	•	•	•		•	•				•	•	•
ADVANCED OPERATING SYSTEMS Clean Slate	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
APPLE COMPUTER II, III Apple-Writer	•	•	•		•	•	•	•	•	•	•			•	•	•	•
ASPEN SOFTWARE Writer's Companion	•	•	•		•	•	•	•	•	•	•	•	•		•	•	•
BEAMAN PORTER PowerText-IBM PowerText-Pascal PowerText-Run-Time	• • • •	• • • •	• • • •		• • • •		• • • •	• • • •	• • • •			• • • •			• • • •	• • • •	• • • •
CHARLES MANN & ASSOCIATES Docuwriter Master Text Processor Personal Text Processor	• • • •	• • • •	• • • •		• • • •	• • • •	• • • •	• • • •	• • • •	• • • •		• • • •		• • • •	• • • •	• • • •	• • • •
COMMODORE BUSINESS MACHINES Wordcraft-80	•	•	•		•	•	•	•	•		•	•	•		•	•	•
COMPUVIEW PRODUCTS Zedit	•		•			•		•	•			•				•	
CORVUS SYSTEMS Edword	•		•	•	•	•	•	•	•	•		•	•	•	•	•	•
CREATIVE SOFTWARE PetWord	•					•		•		•	•				•	•	•
CROMEMCO Writemaster	•		•	•		•	•	•	•	•		•		•	•	•	•
DAN P. BUNTEN Writer's Rescue	•	•	•		•	•	•	•	•	•	•	•			•	•	
DATAMOST Write-On-IBM Write-On-Apple	• • •	• • •	• • •			• • •		• • •	• • •	• • •	• • •	• • •			• • •	• • •	• • •
DATEK SYSTEMS LetterGo	•		•		•	•		•	•	•	•		•	•	•	•	•
DESIGNER SOFTWARE Palantr	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•	
HAYDEN SOFTWARE PieWriter	•	•	•		•	•		•	•	•	•	•	•		•	•	•
IJG Electric Pencil	•		•				•	•	•	•	•	•			•	•	•
INFOSOFT WpDaisy	•		•		•	•	•	•	•	•	•	•			•	•	
INFORMATION UNLIMITED SOFTWARE EasyWriter Orig. EasyWriter Prof. EasyWriter II	• • • •	• • • •	• • • •	•		• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •	•	• • • •	• • • •	• • • •
LEXISOFT Spellbinder	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•	•
LIFETREE Volkswriter	•	•	•		•	•	•	•	•	•	•	•			•	•	
LJK ENTERPRISES Letter Perfect	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•

Charade

August 1982 PERSONAL COMPUTING 93

SPECIAL REPORT

(continued)

WORD-PROCESSING PRINTER/FORMATTING FEATURES

COMPANY/PACKAGE	CONTINUOUS FORMS	MULTIPLE COPIES	ANY PAGE FROM A FILE	SIMULTANEOUS I/O SPOOL	CHANGE VERTICAL PITCH	SPECIAL CHARACTERS	CHANGE FONTS	LINE/FORM FEED	PRINT FROM ANY PAGE	STOP PAGINATION	PAUSE CHARACTER	UNFORMATTED PRINTING	MICRO SPACE SHIFTS	PROPORTIONAL SPACING	JUSTIFICATION Right	Left	Center
MARK OF THE UNICORN The Final Word	•	•			•	•	•	•	•		•	•	•	•	•	•	•
METASOFT Benchmark 2.0 Benchmark 3.0	• •	• •	• •		• •		• •	• •	• •	• •	• •	• •	• •	• •	• •	• •	• •
MICROPRO WordStar	•		•	•	•	•	•	•	•	•	•	•			•	•	•
MUSE SOFTWARE Super-Text 40/80	•	•	•			•	•	•	•	•		•			•	•	•
NEC HOME ELECTRONICS USA NEC Word Processing	•	•	•	•	•	•	•	•	•	•	•	•	•		•	•	•
NORTH STAR COMPUTERS North Word	•		•	•		•		•	•	•	•	•			•	•	•
ON-LINE SYSTEMS Screenwriter II	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
PEACHTREE SOFTWARE PeachText	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
PERFECT SOFTWARE Perfect Writer	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
PROFESSIONAL SOFTWARE WordPro I Plus WordPro II Plus WordPro III Plus WordPro IV Plus WordPro V Plus	• • • • •	• • • • •	• • • • •	• • • • •	• • • • •	• • • • •	• • • • •	• • • • •	• • • • •	• • • • •	• • • • •	• • • • •			• • • • •	• • • • •	• • • • •
QUARK ENGINEERING Word Juggler	•	•	•			•			•	•			•		•	•	•
RACET COMPUTES Electric Pencil	•	•	•	•		•		•	•			•			•	•	
RADIO SHACK Scriptit SuperScriptit Scriptit 2.0	• • •	• • •	• • •	• • •	• • •	• • •	• • •	• • •	• • •		• •		• •	•	• • •	• • •	• • •
SELECT INFORMATION SYSTEMS Select Word Processor	•	•	•	•	•	•		•	•	•		•	•		•	•	•
SOF/SYS Executive Secretary	•	•	•			•	•	•	•	•	•	•	•		•	•	•
SOFTAPE Magic Window	•		•		•	•	•	•			•	•			•	•	•
SORCIM SuperWriter	•	•		•	•	•		•	•	•	•	•	•	•	•	•	•
STRUCTURED SYSTEMS GROUP Word Right	•	•	•		•	•	•	•	•	•	•		•	•	•	•	•
TEXAS INSTRUMENTS TI Writer	•	•						•	•	•	•	•			•	•	•
VECTOR GRAPHIC Memorite III	•	•	•	•	•	•	•	•	•	•	•	•		•	•	•	•
WESTICO WORD III	•	•				•		•	•	•	•	•	•		•	•	•

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letter*

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SPECIAL REPORT

WORD PROCESSING

(continued from page 82)

computer a lowercase capability. Without some kind of lowercase capability, the machine is forced to use inverse video to differentiate between upper- and lowercase. That makes the display difficult to read.

If your hardware is above the Apple II class, then the 80-column capability is there anyway. If you have an Apple, and you think you'd like to use it for word processing but you don't want to put out the money for an 80-column board, you can get one of several character generator ROMs that will give you lowercase letters in a 40-column display for a fraction of the cost of a plug-in board. And there's at least one program, Screenwriter from On-Line Systems, that provides lowercase in the software—no add-on hardware is required.

What they do

Word processors are probably so popular among professionals because so many of them are poor typists. There are many good reasons for that, but often they all boil down to one fundamental problem—lack of practice. And most people would probably admit they don't like to practice so mundane a skill as typing. With a word processor, they don't have to because the production of written documents is a snap.

Think about it a minute. Suppose it's time for another job change, and the old resume needs updating. You get out the typewriter and proceed with the first draft. After reading the draft and reorganizing it, you begin what you wish were the final draft. But you know in your heart it won't be because you're just not that good a typist. Accepting a couple of mistakes, you correct them with strikeouts and finish the draft, then crank in a sheet of paper to start the final copy. As the number of lines on the sheet mounts, you become more and more nervous, knowing that the more characters there are, the more devas-

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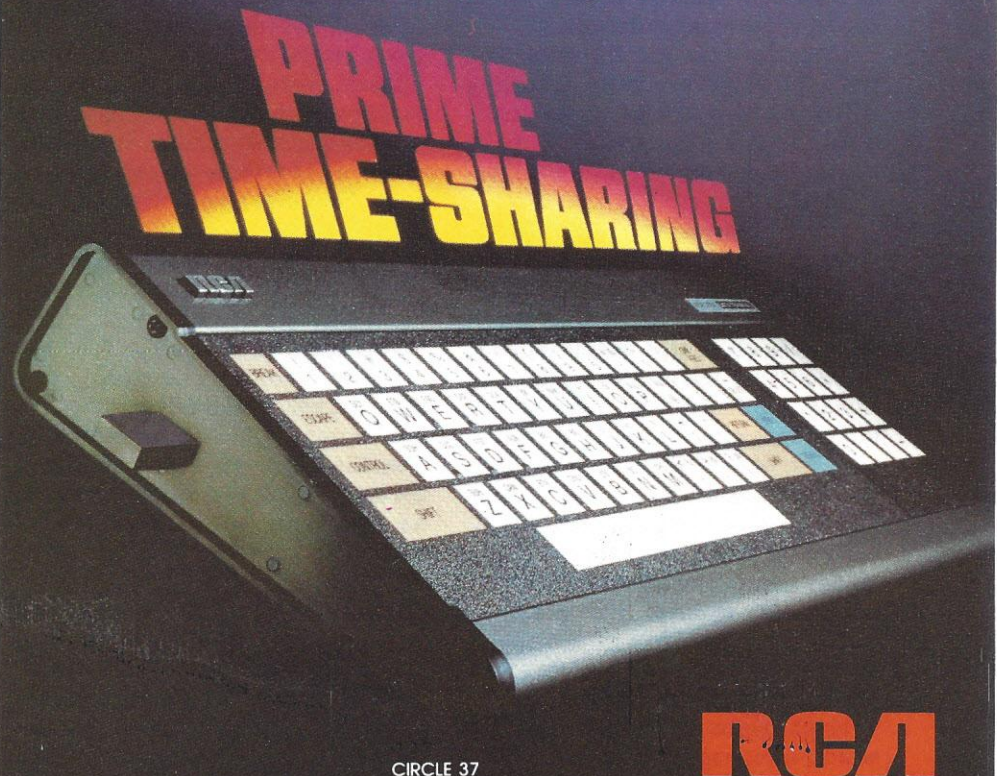
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“Many word-processing packages provide limited help screens. Some provide more than one.”

tating will be a simple typographical error. Your palms get clammy and clammy. Finally, at about the 30th line, you hit the wrong key.

Now what? Correct it? What if there are carbon copies in the typewriter? What a pain! And the pain gets worse as the number of pages begun-but-not-ended increases.

It's all avoidable

Every word processor now on the market has features that can make the experience described above a thing of the past. These include character inserting and deleting, which allow those functions with single (sometimes multiple) keystrokes. Just put the cursor over the letter to be deleted, or the space where you need a character inserted, press a key and voila, the error is gone. Every word processor also has a line-delete feature, as well as a line-insert feature. These are very useful in reorganizing and editing a document. (Editing, by the way, is a term used on almost all word processors. All it means is changing a document.)

These features are the ones that you'll probably use more than any others. At least, my experience indicates that this is the case. They make life a lot easier for the fumble-fingered.

If word-processing systems did no more than what we've already discussed, they'd probably pay for themselves. But they do more—much more. The chart that begins on page 84 lists those features that *Personal Computing* found to be most relevant after canvassing the industry. It's a long list, but one that can really help you understand what to expect from the word-processing package you finally buy. This chart contains terminology that might be confusing to the uninitiated, so brief descriptions of some of its listings are perhaps in order—just to make sure we're all talking about the same thing.

Hyphenation: The capability of the word-processing package to hyphen-

ate words automatically at the end of a line. Many dedicated word-processing systems have this capability, but those that run on personal computers often don't because of the large dictionary required.

Scrolling: The ability to move the text up and down (vertically) or from side to side (horizontally) in a continuous motion.

Jump features: Just what the term implies. Most mean that the software will carry you to a particular page, but some also enable you to jump to the beginning or end of a line, which is handy when you're correcting typos. You can get to the site of an error quickly by jumping to the end of a line instead of using the forward arrow, say, to get to the error.

Block features: Blocks are groups of lines of text. Copying a block means that you can make a copy of a repetitive passage, often referred to as boilerplate, and then place that block at several different points within a document. Moving a block, on the other hand, means to put it in a different place in the document than it was originally.

Insert features: Word-processing packages with insert features will let you insert characters, including blank characters, anywhere you want. They also allow the insertion of blank lines into the middle of the text. After that, you can put characters on the line if you choose, or you can insert a line full of characters as if it were a block of one line.

Delete features: These are pretty clear, except for the delete rest of the line feature, which means deleting from the cursor position to the end of the line. Deleting a word can always be accomplished character-by-character, but some packages allow word deletion with a single keystroke.

Search and replace: Suppose you wrote a letter to Ernest Gray, and you spelled his name several times: “E-A-R-N-E-S-T.” Search and replace would let you find all the instances of the incorrect spelling, and

replace them with the correct version. If the system searches only, it will find the search word and wait for manual correction. An approximate-string search will look for the first three letters in a string, and identify all strings that have that approximate string. In our example, a system with approximate-string search would find Earnest, Ear, Early, Earlier and Ear-splitting, if you told it to search for Ear.

Screen formatting: When you print a document, you have to tell your system how wide the page is, how many lines are on a page, etc. Screen formatting lets you do the same thing on the video monitor so you can change the appearance of the document without wasting the time and paper required for a printout. Underlining on the screen requires a monitor and character generator that will do underscores. Many won't.

Automatic paragraphs

Paragraph methods: There are various ways to indicate a paragraph, and we've listed them in the chart. Some packages will translate text into paragraphs automatically on printing, but in others you may have to use embedded commands to make a paragraph print as a paragraph.

Split screen: This means you can look at two parts of a document at once by splitting the screen into two parts.

Backup/crash recovery: This capability is often a manual one. After entering a certain number of lines (the number is arbitrary, but should be based on how often your power fails or your cord gets yanked from the socket), you save the file you're working on to disk. In the event of a crash (the computer dies), your work is saved and, hence, protected.

Command/status line: This line tells you what operating mode you're in, the line and/or column the cursor occupies, and other pertinent information.

(continued on page 102)

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SILENT/SCRIBE MODELS

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Printing Speed (Char. per Sec.)	10	150	150	120	120	200
	12	180	180	—	—	120
	12.5	—	—	150	150	—
	13.3	200	200	—	—	—
	15	—	—	180	180	150
	16.4	—	—	200	200	164
Enhanced	10	—	—	—	—	100
Expanded Print (Double Width)		Yes	Yes	Yes	Yes	Yes
Dot Addressable Graphics (Dot/In., H/V)		60/72	60/72	75/72	75/72	72/72
Max. Line Width (In.)		8.0	13.2	8.0	13.2	13.2
Audible Alarm		Opt.	Opt.	Opt.	Opt.	Yes
Out-of-Paper Sense		Yes	Yes	Yes	Yes	Yes
Ribbon, Continuous Loop Cartridge (Yds)		30	30	30	30	30
Interfacing: Parallel Cent. Comp.		Yes	Yes	Yes	Yes	Yes
RS-232-C Serial		Yes	Yes	Yes	Yes	Yes

To select a Silent/Scribe printer for your specific needs and wallet is easy. They come with a variety of printing speeds, fonts and line widths. Some models provide both draft and enhanced quality copy; so you can print out your engineering reports, complete with charts and graphs.

Regardless of which Silent/Scribe model you select, certain underlying features and a value-engineering point of view extend throughout the entire product line. The results? Standard dot-addressable graphics; sophisticated communications controls and protocols; flexible and easy-to-use operator controls; quick-change continuous loop ribbon cartridge; and universal interfaces that work with virtually any minicomputer or system.

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"When you're really serious about any kind of software, then take a good look at the documentation."

WORD PROCESSING

(continued from page 98)

Printer features: These are features that allow you to get information out of the machine and onto paper in an aesthetically pleasing form. Many of them depend on the type of printer that's available. Automatic font changes, under software control, are not possible if you employ a daisywheel printer. The print element has to be physically changed.

Continuous forms: At the end of a page, the package will advance to the next page, which is attached.

Multiple copies: The system will print the document N times, but you must specify N.

Any page from file: You can select a particular page to be printed to the exclusion of all others.

Simultaneous I/O spool: Print can be accomplished while other tasks are in progress. Not all hardware can support this feature, but some packages that don't support this feature can be made to with the addition of a hardware buffer/spooler.

Change vertical pitch: Changes in the vertical interval between print positions can be made when necessary, for instance, to print super- and subscripts.

Special characters: These are characters that aren't normally found in printed matter, but they're available in the full ASCII character set. Some packages can make them print, provided the printer is physically capable of producing the character.

Change fonts: A font is a character shape. Dot-matrix printers can often change fonts under software control. Some word-processing packages support this capability.

Line/form feed: The word-processing package will send characters to the printer to make the printer advance a line—or to the top of the next page.

Print from any page: The package will start printing at the designated page, so you don't have to print an entire long document to get

the particular page(s) you want.

Stop pagination: Under program control, a system that can stop pagination will stop printing page numbers at the appropriate point.

Pause command: A command that makes the printer pause so you can adjust it for later operation.

Unformatted printing: This is printing of the text exactly as it appears on the screen, or as it was entered. It's useful when you want to get a look, on paper, at the material that's been entered without bothering to format the text first.

Micro space shifts: The space between characters can change to meet the requirements of the text. Changes in this space are micro space shifts.

What's the format?

Word-processing packages also do a lot of formatting of text before the text ever gets into print. Often this formatting can't be seen if the package won't format on the monitor screen. But the formatting goes on anyway, so the package sends characters and commands to the printer that cause that machine to print the text in the way the user has specified.

Justification: Text is justified when it forms neat, straight-line columns. Typewriters left-justify text. Some word processors right-justify text, so the left and right edges form straight lines. The problem with this is that, depending on the sophistication of the program, a right-justified page could have lines with very few words and large gaps between the words. This often occurs with automatic typesetters of the type used at newspapers. Center justification attempts to avoid this problem by spacing words away from the center of the line, and making the inter-word spacing equal in both directions from the center of the line.

Proportional spacing: This is a technique that makes different letters take up different amounts of horizontal space, depending on the girth of the letter. Proportional spacing al-

lows a "w" to take up more room than a "t" does, which makes for a more professional looking document.

Stop justify: This is a command you'll need if you want the formatter to allow some lines of text to stop short of the edge of the paper.

Paragraph setups: Formatters can handle paragraphing in different ways.

Tabs: These work with word-processing formatters like they do on typewriters, facilitating the use of multiple columns in printed matter.

Headers and footers: Most word processors allow you to insert a title on the pages printed. That's a header. Footlines—or footers—are also often available, like page numbers at the bottom of a page.

Margins: You can set all four margins with a word-processing formatter, and then justify to those margins as discussed in the section on justification.

The remainder of the formatting features are pretty much self-explanatory. Remember that if the formatter is to underline, or to deliver boldface print, it must have a printer capable of those features.

But there are problems

Now that we've listed all these terms, understand that the industry may use different terms for the functions we've defined. There is no standard yet for naming word-processing functions. That means that while you can use the charts we've provided to compare one product with another, they are less helpful in absolute terms. You might ask if a particular package has a particular feature, and be told that it doesn't, only to find out later that the feature indeed exists in that package, but there was ambiguity in the use of the term.

All the packages we mention in the charts are what could be called full-featured word-processing packages for personal computers. They're packages that do word processing and

(continued on page 106)



**In an age when new standards are constantly emerging,
one disk consistently meets or exceeds them all.**

Maxell. The Gold Standard.

Not all disks are created equal. Some are better than others. To find out what's best for you, look for Maxell disks. They now carry the Gold Standard symbol of quality. It's your assurance Maxell disks meet or exceed every definition of quality. No matter who establishes it. We've earned this universal superiority by never relaxing our uniquely demanding quality control. Every aspect of manufacturing is checked, then checked again.

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There is a Maxell disk for the floppy system you use, or plan to use. Check your computer's instructions. Or write for our complete, highly informative brochure.

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WILL SOMEONE PLEASE TELL

ACCOUNTING

Account Keeper
Accounting Plus II
Accounting Plus II Biz Package
Accounts Receivable
Accounts Receivable Balance Forward
Accounts Receivable/Sales Analysis
ACS Basic Accounting System
AMI Client Write-Up
Asset Record System
B/F Accounts Receivable System
Billings Management
Bookkeeper II General Ledger
Bookkeeper II Depreciation
BPI General Ledger
Business Accounting
Business Check Register and Budget
Business Control System
C.P.A.
Client Accounting System
Construction Accounting
CPA Client Write-Up
Datawrite Client Write-Up System
Delivery Service Automation
Depreciation Calculations and Reports
Executive Accounting System
Financial and Management Accounting
Financial Partner
Fixed Asset Accounting
Fixed Asset Depreciation
Fixed Assets/Depreciation Schedules
Fund Accounting System
General Accounting
General Accounting Package
General Ledger
Glector
Insoft Accountant System
Integrated Accounting System
IRAP
Ledger System Business Module
Management - Financial Reporting
MAXILEDGER
Microaccounting Accounting System
MICROLEDGER
MJA Multi-Journal Accounting
Nominal Ledger
One-Type Accounting System I
One-Type Payroll and Accounting
Payssystem Accountant
Peachtree General Ledger
SBCS General Ledger
SNIP - Integrated Accounting
TCS Accounting
TCS Client Ledger
TCS General Ledger
TCS Total Ledger
The Accountant Finance Data Base
The Bookkeeper System
The Boss Financial Accounting
The Business Bookkeeping System
The Controller
The Depreciation Planner
The Software Fitness Program

AGRICULTURE

Adjusted Weaning Weights
BEEFUP-Herd Management
Performance
Cattle Feeding Economics
Corn Harvest Losses
Corn vs. an Alternate Crop
Cow-Calf Profitability
Crop Yields
Economics of Corn Production
Farm Management
Farrow-To-Finish Swine Production
Feeder Pig Production
Fertilizer Formulation
Field Population
Field Size
Finishing Feeder Pigs
Job Cost (Crop Cost)
Least Cost Fertilizer Application
Liming Soil
Liquid Manure and Fertilizer
Net Energy for Feedlot Cattle
PEDIGREE-5 Generation Annotated
Pedigree
Protein Balancing for Feedlot Cattle
SBCS Agri-Ledger
Selling Wet Corn vs. Dry
Sheep Production Economics
Soil Erosion
Soybean Harvest Losses
Swine Ration Analysis
Swine Ration Formulation

APPLICATION PROGRAM DEVELOPMENT AIDS

A-FORTH
ABT Pascal Tools
APEX-6502 Assembly Language
Apple-80 Disassembler
Assembly Language Development
System
AUDEX-Audio Programming Aid
CBASIC Program Maintenance Utilities
CINDEX
Cosapple 1802 Disassembler
CRFORM Programmer Productivity
Diagnostics II

DISTEL-Disk Based Disassembler
Executive Planning System
Floating Point Dictionary
Forms 2
Key Perfect-Checksum Table Generator
Linkdisk-Disk Utility for Apple Pascal
Linkvideo-Screen Utility
Lower Case Character Generator
MULISP/MUSTAR-80
OGI-Forth-Implementation of FIG-Forth
Pascal Programmer
Pascal Level I
Pearl III-Rapid Logic Generator
Personal Programmer
Prism/Ads Data Base Generator
Program Development System I
Program Writer for Non-Programmers
Programming Aids 3.3
Quic-N-Easy Application Development
RAID-Real Time Assembly Debugger
Scientific Data Base
SID-Symbolic Instruction Debugger
Stok Pilot-Menu Generator
STRING-80
STRING-BIT
Systems Analyst
Teacher Plus Teaching & Reference Pkg
The BASIC Teacher
The Last One-Program Generator Pkg
The Toolbox Programming Utilities
Tiny-C-Interactive Programming
UCSD Pascal
Unlock Development Tool
V-COM Disassembler Package
Z8000 Cross Assembler

BUSINESS MANAGEMENT TOOLS

Analyst-Business Productivity
Apple Sack General Business Program
Bookkeeper II-Sales Analysis
Business Pac 100
Business Planner
Creative Financial Package
Desktop/Plan
Execuplan Planning & Forecast
Financial Modeling System
Financial Planning Series
Financial Planning/Analysis
Finplan/Financial Planning
FPT-2020 Financial Planner
FPL-Financial Planning Language
Magic Worksheet
Magical-Forecasting Package
Micro-DSS/Finance
Microfinance-Financial Modeling
Milestone-Critical Path Network Analysis
Optimiser
PFS-Personal Filing System
Personal Report System
Plan 80-Financial Planning & Analysis
Project Boss-Mgr's Cost Control System
Project Planning and Budgeting
Retail Purchasing & Pricing
Salary Planner
Senior Analyst
Supercalc-Electronic Spread Sheet
Support Pkg for Real Estate Mgmt
T/Maker II-Visual Calculating Tool
The Analyzer
The Budget Planner
Universal Business Machine Planning
and Forecasting
VisiCalc III
VisiCalc Real Estate Template

CAPITAL PROJECTS PLANNING & CONTROL

Angle Project Scheduling
APM-Project Management System
Jobtrak-Project Tracking
Milestone Project Management
Project Management System
Project Planning

COMMUNICATIONS

Apple Access III
BISYN-80
BSTAM
Class Data Recorder
CM-900 Burroughs Network Services
Communications Program
Crosstalk Smart Terminal/File Transfer
Data Capture 4.0
Data Transporter Package
Datalink
DTS-3-Serial Data Transfer
Electronic Mail
IBM-CP/M Allows Transfer of Data
IE/Modem
Intercom Communications
METTY-Intelligent Terminal Package
Micro-Courier
Micro-Telegram
Microlink-80-File Transfer Program
Reformatter-CP/M IBM Data Transfer
Remote Console Program
Smartterm-CP/M Terminal Program
Term II-Computer Intercommunications
Term Intercommunications Package
TTY-Communications With Other
Computers
U-Net-Shared Resources Network

Ultimate Transfer
Visiterm-Communications Program
VT-100 Emulator
Western Union Interface

DATA MANAGEMENT

ANALYST
CBS-Configurable Business System
CCA Data Mgt System
CM 2020 Configurable Manager
Condor Series 20
Data Management Program
Data Manager
Data Master
Data-View Electronic Filing Cabinet
Database II
Database Management
Datafax
Dataflow-Info Processing
Datastar
Datastore
Datatree
Disk-Edit-Screen Oriented Disk Editor
DMS-Data Mgmt System
FABS II-Rapid Keyed Access
Fast Entry for Tabs Business Modules
FINDAFYL-Reference Retrieval System
FMS 80-Data Base Management System
GBS Database
General Database
HDBS-Hierarchical Data Base
IFO Database Manager
Information File Organizer
Information Master-Data Mgmt System
KTDS-Key to Disk, Data Entry
Linkindex-Pascal Utility
MAQ/Base-Data Base Management
Manager-Relational Data Base
MDBS-DRS-Micro Database Mgt System
MUMPS-Language for CP/M Database
MUMPS-Data Mgmt Program
PRISM/IMS-Information Mgt System
RADAR-Random Access Data Acquisition
Reprogrammable Data Base
Scientist-Data Base & Statistical Pkg
Selector III-Data Base Processor
Selector IV-Data Base Mgt
Selector IV-Key Access Info
Selector V-Data Base Mgt
STATPRD-Integrated Database System
Stoneware Utility Package
Super Kram II - Multi-Keyed
Random Access
The Reprogrammable Data Base Program
VisiDex-Data Base Mgt System
VisiFile-Data Base Mgt Package
Whatist?-Conversational Query/Retrieval

DATA SECURITY SYSTEMS

Absolute Security
Encode/Decode Security System

DISTRIBUTION

ABT Retail Manager
Beer Distributor Management
Inventory, Order Entry, Invoicing
Oil Jobber Management System
Order Entry and Inventory Control
The Store Manager
Wholesale/Retail Distribution System

EDUCATION - BUSINESS

Accounting Tutor
Comparative Buying
Income Meets Expenses
Interactive Typing Tutor
Job Readiness-Assessment &
Development
Masterytype-Typing Instruction
Money Mgmt Assessment
Typing
Typing Tutor
You Can Bank On It-Bank Concepts

EDUCATION - CHEM/PHYSICS

Acid-Based Chemistry
Atomic Structure
Chem Lab Simulation
Chemical Equilibrium
Chemistry With A Computer
Fundamental Skills for General Chemistry
High School Chemistry
High School/Jr. College C.A.1. Biology
High School/Jr. College C.A.1. Physics
Organic Nomenclature
Physics

EDUCATION - ENGLISH

A Batch of Endings
Agreement of Pronoun/Antecedent
Alphabetize
Capitalization
Catalog Cards
Commas
Compu-Read
Compu-Spell
Coordination
End Marks
Excess Words
Faulty Coordination
Hearing the Homonyms
Irregular Verbs

Is It "ie or ei?"
Language Drill
Locate Books on the Shelf
Magic Spells
Misplaced Modifiers
Parallel Structure
Possessing the Possessives
Prefixes & Suffixes
Quotations
Reading Level
Readings In Literature
Run On Sentences
Scramble
Sentence Diagramming
Sentence Fragments
Speedreader
Spell-N-Time
Spelling Bee with Reading Primer
Spelling Those Plurals
Still More Nasty Demons
Subject/Verb Agreement
Subordination
The End of the Endings
Those Nasty Demons
Understand the Card Catalog
Understand the Title Page
Use an Index
Use the Table of Contents
Using Adjectives/Adverbs Correctly
Word Scrambler & Super Speller

EDUCATION - MATH

Addition & Subtraction
Algebra I
Basic Math Skills
Compu Math: Arithmetic Skills
Compu-Math Decimals
Compu-Math Fractions
Counting Bee
Decimal Estimation
Division Drill
Drill II
Elementary Math
Fractions
Geometry
Geometry and Measurement Drill
Lessons in Algebra
Matching and Using Numbers
Matching Geometric Figures
Math-Addition & Subtraction
Matrix Mathematics Package
Measurements
Multiplication & Division
Mumath-PO Symbolic Math
New Subtraction
Numerical Analysis Mathematics
Problem Solving
Problem Solving in Everyday Math
Sets
Sign Drill/Typing
Statistical Analysis I Mathematics
Statistics 3.0
Typing Fractions

FOREIGN LANGUAGES

Chinese Lessons
Foreign Words and Phrases
Greek Roots and Prefixes
Japanese Lessons
Latin Roots and Prefixes
The French Hangman
The Russian Hangman
The Spanish Hangman

GAMES

Adventures
Alien Rain
Alien Typhoon
Almanac - The Time Machine
Amaze
Analiza
Animal
Anti-Ballistic Missile
Apple Adventure
Apple Bowl
Apple Fun
Apple Panic
Apple Pack 3 - Adventure Pak
Apple Pack 7 - Space Sack
Apple Pack 8 - Game Sack
Apple Pack 9 - Base Star
Apple Stellar Invaders
Apple-oids
Asteron
Astro-Scope
Astrology
Autobahn
Backgammon 20
Battle of Midway
Beer Run
Best of Muse
Biorythms
Blackjack
Blackjack
Both Barrels
Tetrad
Bridge 2.0
Bridge Tutor
Bubbles, Planetoids and Burnout
Cartels and Cutthroats
Castle Wolfenstein
Chambers of Xenobia
Chebychev 1
Chebychev 2
Chronicles of Osgroth
Civil War
Compu-Math Arithmetic
Compu-Math Decimals
Compu-Math Fractions
Computer Air Combat
Computer Baseball
Computer Bismark
Computer Conflict
Computer Napoleons
Computer Quarterback
Cops and Robbers
Cosmo Mission

The Solar System
Transportation History
Typing
United States
Visual Perception Tests
Weather Fronts
Work Relationships
World Desert Region
World Polar Regions

FINANCE-INVESTMENT & PORTFOLIO ANALYSIS

Analysis I-Stock Trend Data Analysis
Commoapx System
Computer
Compuarc File Reader
Dow Jones News &
Quotes Reporter
Dow Jones Portfolio Evaluator
Dowlog-MC
Electronic Stock Package
Engineer's System For Trading
Forecast I
Forecast II
Fotofolio-Visual Display w/Statistics
Gann's Square of Nine Analysis
Intelligent Investor
Investment Analysis
Market Charter-Technical Analysis
Moneybee-Investment Analyst
Options 80-Stock Options Analyzer
Portfolio Master
Quotecharter
Quoteprocessor
Ratorm-Investment Analysis
Stock and Options Analysis
Stock Forecasting
Stock Market Management
Stock Market Utility
Stock Option Analysis
Stock Tracker
Stock Valuation Program
Stocksheets
Strategy M-Monitor Price Change
Dynamics
The Clover Method Trading System
The Stock Portfolio Program
Tickertec-Tickertape Program
Wilens 6 Systems Analysis

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Compu-Math Fractions
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Computer Baseball
Computer Bismark
Computer Conflict
Computer Napoleons
Computer Quarterback
Cops and Robbers
Cosmo Mission

County Carnival
Cyber Strike
Disk Talker
Dr. Chips
Dragon Fire
Dungeon
Executive Fitness
Falcons
Fantasyland 2041
Fastgammon
Flight Simulator
Galactic Attack
Galactic Wars
Galaxy Wars
Games People Play
Gamma Gobins
Gobbler
Golf/Cross-Out
Golf
In The Army Now
Into Ships
Jett Fighter Pilot
Klondike 2000
Lost By Ship
Mastermind
Meteoroids in Space
Micro Othello
Mimic
Mind Games Package
Mission Asteroids
Mystery House
Need an Analyst
Nominos Jigsaw
Oil Tycoon
Olympic Decathlon
Operation Apocalypse
Orbitron
Outpost
Paddle Fun
Pegasus II
Perception 3.0
Phantoms Five
Planetoids
Plot 3D
Pokeno
Poker Slot Machine
Pool 1.5
Pot 'O Gold I
Pot 'O Gold II
President Elect
Pro Football
Pro Picks
Project Omega
Pulsar II
Race For Midnight
Raster Blaster
Red Baron
Rendevous
Robot Wars
Sahara Warriors
Sargon II (Chess)
Satellite Trak
Shell Games
Shuffleboard
Skybombers
Skybombers II
Sneakers
Snoggle
Soft Porn
Softside Publications
Space Eggs
Space Warrior
Spellguard
Spelling Bee
Star Cruiser
Star Dance
Star Thief
Startraders
Startrek
Stock
Sub Attack
Tawala's Last Redoubt
Teacher's Pet
Temple of Apshal
Terrorist
Tetrad
The Strip
The Asteroid Field
The Great Escape
The Horse Selector II
The Prisoner
The Scorekeeper
The Shattered Alliance
The Warp Factor
Three Mile Island
Torpedo Fire
Ultima
Voyage of the Valkyrie
War and Games
War Games
Warp Factor
Watch Your Moves
Win at the Races
World's Greatest
Blackjack
Wumpus
Xplode

ME WHAT AN APPLE CAN DO?

GRAPHICS/ COMPUTER-AIDED DESIGN

3-D Surface Plotter Package
A2-3D1 Graphics Family
ABT Barwand Software
Action Sounds & Hi-Res Scrolling
Apple Plot
AppleGraphics II
Artist Designer
Bar Chart (Histogram) Graphics
Business Graphics III
Circuit Designer Graphics
Circuit Simulator
Creativity Tool Box
CURVIT
Data Plot
E-Z DRAW
FLGDZINE
Graforch - Development Tool
Graph - Fit
Graph-Pak
GRAPHPOWER
Hi-Res Secrets
Line Graphics
MC Painting
ORIFICE
Pascal Animation Tools
Pascal Graphics Editor
Perspective Plot - 3-D Graphics
PGE - Graphics Editing Package
PILOT Animation Toolkit
Polar Coordinate Plot
RGL Real Time Graphic System
Screen Director
Shape Table Generator
Stats-graph
Super Shape Draw & Animate
Tablet Graphics
The Coloring Board Program
The Designer
Topographic Mapping
Ultra Plot
Utopia Graphics Tablet System
VACVESL - Vacuum Vessel Design
VESDZINE - Design of Vessels
VISITREND/VISILOT
XY Vector Plot Package

HOME MANAGEMENT

Address File
Auto Records
Checkbook Balancing
Checking Account Management
Chequimate
Diet Analysis
Financial Analyzer
Five Minute Financial Check-Up
Grocery List
Home Finance
Home Inventory File
Home Money Minder
Home Purchase Analysis
Magazine File
Mortgage Analysis
Personal Accounting System I
Personal Expense Record
Personal Finance Manager
Personal Financial Planning
Programmed Exercise
The Personal Check Manager

INCOME TAX

Dow Jones Portfolio Evaluator
Individual Tax Planner
Micro-Tax Individual Tax Package
Micro-Tax Integrated State Income Tax
Micro-Tax Partnership Package
SHORTAX - Tax Planning Package
Tax Planner
Tax Preparer
TRPS - Tax Return Preparation System

INVENTORY CONTROL

ARM-1000 - Rental Business
Basic Business Inventory
Bill of Materials
BPI Inventory Control
Inventory Inventory System
Inventory Accounting
Inventory Control
Inventory Management
Inventory Management for Stock Control
Inventory Pac
Inventory System Business Module
Manufacturing Inventory Control
MATSTAT-Materials Tracking
Order Entry/Inventory Control
Rechtree Inventory System
Point-Of-Sale Retail System
Property Manager for Moveable Equipment
Retail Inventory
Rogis Stock Control for Components
Stock Control
Stock Recording
Stockfile Inventory System

Stockroom Inventory and Purchasing
Structured Systems Inventory Control
TCS Inventory Management
The Order Scheduler

JOB & CONTRACT COST ACCOUNTING

Billflow
Bookkeeper II-Job Costing
BPI Job Costing
Contract Billing
Contractor Job Cost
Cost Accountant
Job Accounting System
Job Control System
Job Cost Accounting
Project Cost Accounting for Architects
Project Cost Accounting for Engineers
The Software Fitness Job Cost Analyst
Time Recording/Job Cost Analyst
Timerec-Transaction Carry Forward

MAILING LIST & LABEL PROCESSING

Address Book Mailing List
Apple III Mail List Manager
Apple Mail Sack
Apple Post
Benchmark Mail List
Commercial Mailer
Mail List
Mail80 Mailing List Software
MAILER-Name & Address Management System
Mailing Address
Mailing List Package
Mailing System
MAILMERGE
MAILPRO
Mailroom-Mailing List Management
Master Mailing List
NAD-Name & Address Selection System
Name And Address
Postmaster-Mail Management
Professional Mailout
School Mailer
Small Business Mailing & Filing
Super-M-List Mailing List Program
Ultra Plot/Mailing & Filing System I

MARKETING/SALES ANALYSIS

EASYTRAK-Salesmen Monitoring Package
Marketing Systems - Proposal Developer
Office and Agent Productivity Package
Sales Analysis
Sales Pro Prospect Mgt Package
Sales Tracker
SALESLOG - Sales Mgt Program
SNAP - Questionnaire Design and Printing
TCD Life Insurance Computer System

MISCELLANEOUS

BILL - Building Energy Use
Circuit Analysis
Hand Holding BASIC
Insulate
Mini-Warehouse System
Stepwise Multiple Regression

MUSIC

Alpha Syntauri Music Synthesizer
Alpha Music Theory
Apple Sack Music & Graphics
Apleedion Music Synthesis System
Music System
Musicomp
The Electric Duet

ORDER ENTRY/ ACCOUNTS RECEIVABLE

BPI Accounts Receivable Program
Cash Receipts System
Company Sales
Invoice Compiler
Invoicing
Membership Billing
MICROREC
Multi-Property Accounts Receivable
Open Item Accounts Receivable
Order Entry
Order Entry and Billing
Order Entry and Invoicing

Order Tracking System
Rechtree Accounts Receivable
Rechtree Sales Invoicing
Progressive Billing
Purchase Order System
Receivables System Business Module Receiver
Sales Invoicing
Sales Ledger
Sales Order Processing
Software Fitness Program - A/R System
Structured Systems Accounts Receivable
T-SOP Sales Order Processing
TCS Accounts Receivable Package
TCS Total Receivables
The Biller

PAYROLL PROCESSING

Advanced Payroll Package
After-The-Fact-Payroll - updates records
Apple Payroll System
Bookkeeper II-Payroll
BPI Payroll
Business Basic Payroll System
Contractor Payroll
Jobcost Payroll
Micro payroll
Passive Payroll
Paymaster
Paymaster-Payroll System
Payrecord I
Payroll
Payroll Accounting Package
Payroll Assistant
Payroll I
ReachPay
Piece Rate Payroll System
Post Facto Payroll
Print/Paycheck Accounting System
Run Time Payroll Program
Sheltered Workshop Reporting
Structured Systems Group Payroll
TCS Payroll Package
TCS Total Payroll
Variable Worker's Compensation
WH-347-Accessory program for Jobcost

PERSONNEL MANAGEMENT

AMI Post-Facto Payroll
MICROPEERS - Payroll & Personnel Mgmt
Personnel Data Recorder
Personnel Office - Federal Compliance
Personnel Record
Personnel Record/Employee Records System

PROFESSIONAL OFFICE SYSTEMS

AMI Omegabyte Time & Billing
BETA - Stand Alone Time & Billing System
Billkeeper - Professional Billing
Client Billing System
Client Record/Bill Preparation
DataLaw System 3-Law Office Mgmt
Data Time
Dental 80A-Dental Accting & Billing
Dental Billing Package
Dental Office Management
DentalEase
Dentistaid - Dentist Office Management
Insyst (Insurance System)
Legal Billing & Timekeeping System
Legal Clerk - Office Management System
Legal Time Accounting System
Medicaid Day Treatment
Medical Accounting and Billing
Medical Clinic
Medical II - Office Mgmt System
Medical Office Management
Medical/Dental Management System
Medical/Manager
MedicalEase
MedPak
Medtips - Billing & Insurance Forms
PAS - 3-Patient Billing & Accts Receivable
Patient Accounting System
PIP-Payroll/Invoicing Program
Professional Office Management
Professional Time & Billing
PTA - Professional Time Accounting Pkg
Series 8000 Dental Mgmt

Series 8000 Medical Mgmt
Series 9000 Family Dental Management
The Patient Scheduler
Timeclock
Timesaver - Time Accounting
Timesaver Client Billing System

PROGRAMMING LANGUAGES

Ada Compiler
APL/V80 Language
Apple III Business Basic
Apple III Pascal
Apple FORTRAN
Apple Logo
Apple PILOT
ASM 65-Assembler
BASIC A+ - Extended Business Basic
BASIC Compiler
BASIC-80
BASIC/Z - Native Code Compiler
BD Software "C" Compiler
C Compiler
CBASIC 2 Compiler
CIS COBOL
COBOL 80
Cos Assembler
Cos COBOL
Focal 65-High Level Programming
Forth 86
Forth-Language Compiler
FORTRAN 80
FORTRAN IV
Hand Holding BASIC
KBASIC - Microsoft Disk Extended BASIC
Language System with Apple Pascal
LISP-80 Compiler
MAC 8080 Macro Assembler
MULISP Compiler
MULISP/MUSTAR 80
muMath/muSimp 80-High Level Programming
Nevada COBOL Compiler
Pascal Compiler
Pascal/M86
Pascal/MY+With SPP-ISO Standard
PL/1-80-Programming Language
RATFOR - FORTRAN Language
S-BASIC
SSS FORTRAN Compiler
Softronics
Stiff Upper Lip
TCL Disk BASIC Interpreter
TCL-Pascal
TEC 65-Editing Language
Tiny BASIC High-Level Language
Tiny C
Tiny Pascal
Tiny-C-Two Compiler
Transform II
UCSD Pascal
Whitesmith's Compiler
XPLO-Structured Language
XY BASIC Interactive Process Control

PROGRAMMING UTILITIES

Apple Sak 4 - Utility Package
Basic Utility Disk
Disk Utilities 3
Disk Utility Package
Disk-o-Tape-Pascal
DOS Tool Kit
File Maintenance Package
MAC/Sam Keyed File Mgmt System
MAC/Sort-Record Sort/
Masterdisk-disk Sector Editor
MSORT - for COBOL 80
Pascal Utility Library
Pascal - Sort Program
PSORT - Pascal File Sorting
QSORT - Sort/Merge Program
SORT/B - Hybrid Sort
Supersort
Ultrastart

PURCHASING/ACCOUNTS PAYABLE

Accounting Payable
Accounts Payable Business Module
Accounts Payable/Purchase Order
Bookkeeper II - Accounts Payable
Cash Disbursements Posting System
Check Writer
Company Purchases

Contractor Accounts Payable
Disk-O-Check
Micropay-Accounts Payable
Print Check Accounting System
Purchase Ledger
Structured Systems Group Accts Payable
T-POP - Purchase Order Processing

REAL ESTATE

American Software Property Management
Apartment Building Investment Analysis
Apartment Manager
Commercial Property System
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Office/Apartment Real Estate Management
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Property Management System
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WORD PROCESSING

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Apple Writer III
Benchmark - Word Processing System
Docuwriter Text Processor
Easywriter Word Processing
EDITRIX 1.0 - Word Processing
Form Letter Module
Formulex - Business Form Design
Goodspell
Letter Master - Basic Word Processor
Letterlight Correspondence Processing
Letterrite Word Processing System
Magic Spell - 20,000 Word Dictionary
Magic Wand - Phrase Insertion
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Report Writer - Word Processing
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“Look for word processors that can access files created by other programs, like spreadsheet and graphics programs.”

WORD PROCESSING

(continued from page 102)

nothing else. Simply because of space limitations, we can't include programs that provide word processing along with other functions, although such programs are beginning to appear. And we've elected not to mention programs that check spelling by name, since they aren't properly called word processors. They take a text file that you've prepared on a word processor and check the spelling of the words in that file. If you think you're a poor speller (or proof reader), it might be wise to look for a spelling checker that works with your word processor's text files. Spelling checkers won't catch everything, and they can't tell if a word is spelled right from context. (They can't tell if "to" should be "two" or "too.")

Easy to use

Ease of use is a market buzzword that's heard everywhere these days. It seems that all the people who make and/or sell personal-computing software have decided that people need products that are easier to use than the last product was. That's good because it means more people will be able to use the benefits of personal computing. And nowhere is ease of use more noticeable than in word-processing software.

Word-processing packages vary greatly in this respect. Some of them provide almost no on-screen help, for example. With these packages, you must turn to the written documentation to figure out how to do anything. Other packages, and there are many now, provide limited help screens. Some provide more than one help screen, depending on where you are in the program—one for a disk-handling system, say, and another for the text editor. You'll probably find, though, that some functions quickly become second-nature, and you'll soon get to the point where you will never need help to use them. Others you'll want to use occasionally, and

the help screens, if your program has them, will provide a quick-and-easy way to remember such functions. Some functions will be used so rarely that you'll have to go to the written documentation to refresh yourself on their operation.

So one thing to ask about when you're shopping for word-processing software is the number and kind of help screens the packages you're interested in provide. These screens can prove to be a timesaver if they're there. But there's yet a more important ease-of-use feature to check—the written documentation.

It's a fact; a good piece of software can be ruined by inadequate documentation. A poor piece of software is just that, but good documentation can really help. When you're really serious about word processing, or any other kind of software for that matter, take a good look at the documentation. See if it's easy for you to find out the kinds of things you'd probably like to know. Ask yourself:

- Can I find out how to get started?
- Are the major features easy to find in the documentation?
- Is there an index?
- Is there a table of contents?
- Are there any photos of the screens included?

There are other questions to ask, but these are probably the most important.

Many people will tell you that word processors that run on personal computers just aren't very easy to use because they all use multiple keystrokes to get commands entered. It's true that in the absence of dedicated function keys, the control key, along with others, becomes a real workhorse. Some people in the industry will argue, and pretty convincingly, that function keys (delete, insert, cursor-control and the like) will actually slow a typist down because he has to search for the function key, which is in an unfamiliar place on the keyboard. So, the argument goes, a CNTL-F sequence to move a cursor

is actually faster than using a cursor-control keypad.

Whether this argument is correct is probably a matter of individual preference. The point is that you shouldn't be swayed by a particular package that can use control keys, or can't use them, until you've tried both and decided for yourself.

What's in store?

People who try to predict the future are subject to more than their share of "I-told-you-so's," but the temptation is there, nevertheless, and writers often succumb. The future of word processing will be shaped by the new products that are now appearing on the scene. The Concept computer, for example, from Corvus Systems in San Jose, Calif., has a nifty advanced feature in Edword, its word-processing package. Edword, made possible by the 16-bit microprocessor and large memory inside the machine, remembers all the editing changes you made on a document in a last-in-first-out (commonly called LIFO) buffer. There's a function key on the keyboard called UNDO that, when pressed, undoes the last change you made. If you keep on keying, you keep on undoing until your document is back in its original shape.

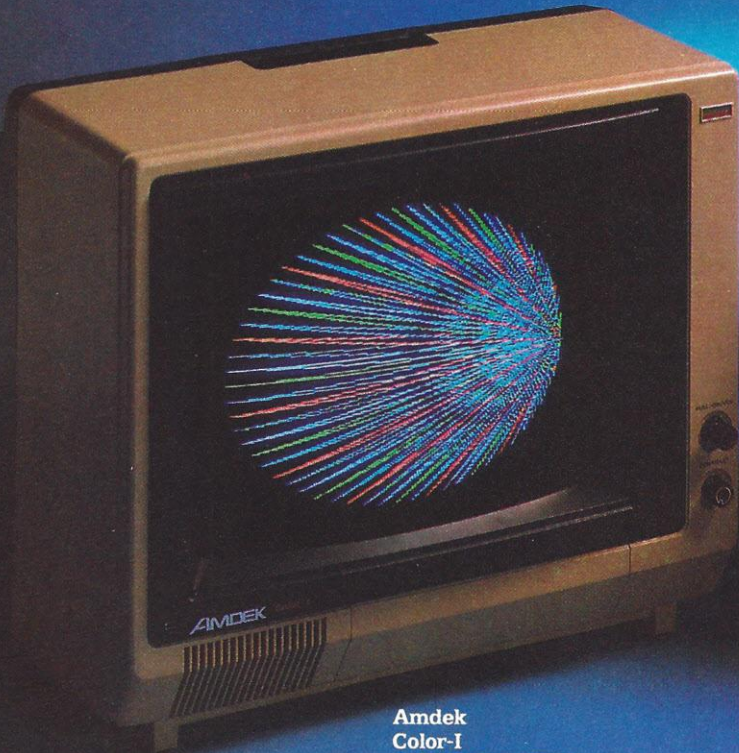
That's here now. Certainly, word processors will get more sophisticated in the future as more computing power is brought to bear. Look for things like color enhancements and split screens that let you view two parts of a document simultaneously when searching for word-processing software. And, in the near future, look for word processors that can access files created by other programs, like spreadsheets and graphics programs. Such products, which are already beginning to appear, will allow you to incorporate graphics, columns of figures, and text into the same document, merely by making the files available to the word-processing program of the personal computer.



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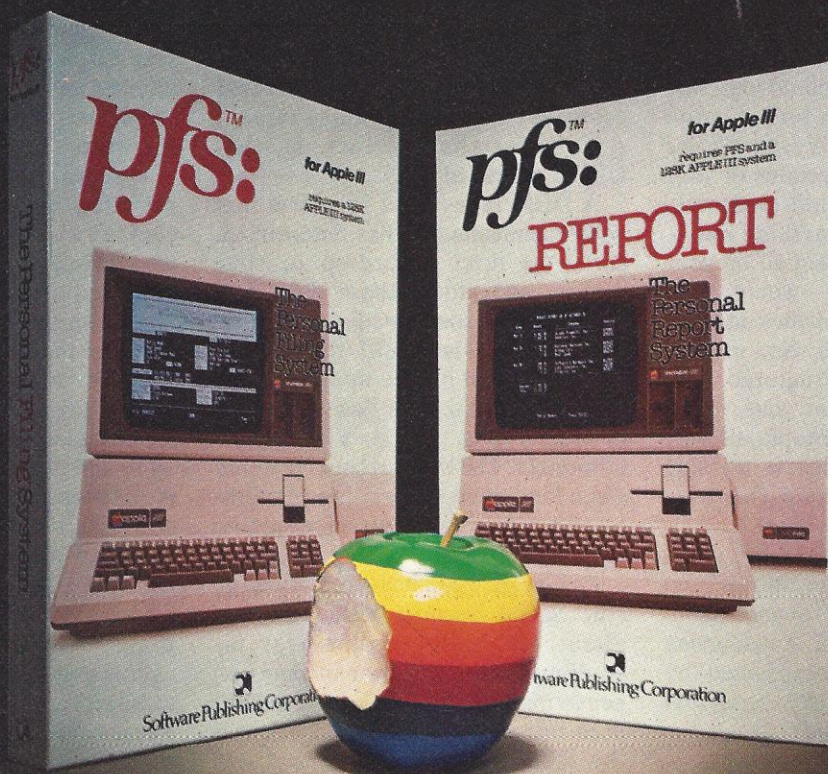
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Managers Computerize To Organize With DBM

For years, data-base management was reserved to mainframes. Now, with DBM software available for personal computers, managers are monitoring their own information—and it's always right at their fingertips

by Edgar Coudal

Just what is a data-base management system (DBM)? What can it do? And how does it do it?

The answers to these questions are limited only by the imagination of DBM users. But a good place to begin to understand the capabilities inherent in a DBM system is perhaps no farther away than your nearest telephone book.

First, someone had to decide exactly what they wanted to put into that phone book, which turned out to be your name, address, phone number and maybe the name of your company. All that would eventually become *data input*. Anything else—such as your college degree or your chihuahua's pedigree—would have been superfluous; the phone company could have cared less. So, in that sense, the input was structured.

Next the inputs from you and all your neighbors—and people all over town—were put together in a single collection. That became the telephone company's *data base*.

A publisher then took all those data and organized the information in alphabetical order, according to last name, and, presto! A telephone book. That was accomplished by what is commonly called *sorting and organizing* the data base.

Edgar Coudal is a Chicago-based consultant who writes frequently about computers in business.

But, of course, there are more ways than one to organize a data base. A second publisher might sort and organize the listings according to specific addresses. A third might do it by listing subscribers according to their telephone exchanges. And a fourth, if he wanted to, might break down the listings according to those living in specific neighborhoods.

All of the above are similarly possible through the use of a personal computer data-base management system, for that, in fact, is what DBMs are all about.

A DBM takes input in a form that you or someone else has determined, sorts the data according to your wishes, and stores those data permanently on some media such as a floppy disk. The DBM then allows the user to call it back up in whole or part, manipulate it, or do any number of other things with it. Virtually all computer DBMs further provide some kind of report-writing capability to produce printouts of whatever output you want.

A data base can be incredibly large (the Social Security data base has about 1.6 billion entries) or incredibly small. My own income/expense manager has only a few hundred entries (mostly expenses). But if the DBM is properly designed and fitted to the user's needs, it can offer one of the most valuable and powerful individual tools in all of personal

computing, both for business and personal use.

There are really two kinds of data-base management systems that users will routinely encounter in computer systems. The first is the relational—first, only because this kind of data-base manager is what most people would really like. The name “relational” comes from the fact that you can retrieve data from it by naming any of a number of relationships that parts of the data have to the whole.

For example, suppose you had a personnel data base for your small company. On that data base, you may have entered the name, address, phone number, age and start date of all the employees of the company. You can then retrieve data about any of these employees simply by referencing any of the particular fields of data you have entered. If you need to know the names of those of your employees whose age is less than 40, you can specify that data field to a relational data base, and the data-base manager will find everyone for whom that data relation fits. The beauty of a relational data-base management system, then, is its ability to cross reference data and retrieve data automatically, based on arbitrary relationships in the elements of the data.

The second kind of data-base manager is the hierarchical manager.

***“The mystery of DBM disappears
when you have direct access to
all the information in the
whole system.”***

This one isn't quite so easy to use because there's only one way into the data—and that way follows a hierarchy of data elements. Consider the phone book again. Telephone books in most large cities have listings for federal, state and local governments. Within each of those listings are the listings of subordinate agencies. So, if you need to find the number for the local National Guard Armory, you have to look in the state government listings, then under the Department of Military Affairs, and there you'll finally find the listing for the local Armory. (At least, that's the way it works in New York City—other localities will have different listings.) The point is: There's only one path that can be taken to find the number sought, and that is through a chain of data, or a hierarchy of data.

What's inside

Just as important as the type of data base, though, is the data structure itself. Users of data bases on personal computers will find themselves structuring the data, so they need to know what the data structures are called. Here the people who design the data bases try to make the structure close to familiar systems. And since these systems are physical file cabinets, the data are usually named with filing terms. So when you use, for example, PFS from Software Publishing in Mountain View, Calif., you find that the first major task to accomplish is the design of a form. And to get to the form-designing stage, you first have to name a file.

After the file is named, a blank form appears on the screen, and the user sets up data categories such as a name field, an address field and the like. After the form is defined, it is stored (on disk in the case of PFS). The user can then add data into the form whenever he wishes, with the system, in effect, prompting for the next piece of data.

If that sounds like a lot of work—designing the form, inputting the

data and so on—it is. The absolute amount of work depends on the stage of the project the user is in. Automating an existing data base, like a customer file, is a big project. Updating it, on the other hand, shouldn't be too onerous. And the dividends are clearly well worth the time and effort expended.

Some data-base management system users buy total turnkey packages of hardware and software dedicated to a specific job. Others select a balanced mix of various manufacturers' hardware and use both off-the-shelf and custom-written software. But almost all users find additional and valuable applications beyond the original DBM implementation.

Start-up problems are minimal—perhaps even less than most users expect. Documentation and manuals can be a problem, but they're improving fast. And those who approach their DBM installations from a user standpoint, rather than a data-processing standpoint, seem to have the easiest time of all.

Computing great America

Take the case of Tony Scott, employment manpower utilization manager for Marriott's Santa Clara Theme Park in California. For years, he had a problem: keeping track of 10,000 people either employed by or applying for work at the park at any given moment during peak season.

“Keeping an employment record system for a big company is a big job,” Scott says, “but ours is particularly involved because of the seasonality of the business and the diverse nature of the people we hire—specialists in everything from maintenance to music.”

So two years ago, Scott began looking for a better way by looking into personal computers and data-base management software, and finally selected The Data Manager (TDM) to keep track of all his employment records. By the start of 1982's busy summer season, he al-

ready had about 5000 complete employment histories stored in his TDM, and expected that figure to grow to almost 10,000 by season's end.

“Basically,” Scott says, “the problem you have with employment records is how to file them so you can find the applications and histories again. Do you file them by name? Or by job applied for? Or what? With a computerized system like ours, you can assign codes to everything—we have 40 job skill codes alone—and then have the computer search the file when you need someone.”

In this case, the computers are four Apple IIs, accessing a single data base that is maintained on a Corvus 10 megabyte hard disk storage device.

“With the search flexibility this software provides,” Scott says, “I can go into the computer and ask it to show me all the people who have applied for jobs as a glassblower, who are available to work weekends during the spring and full-time during the summer, and any other requirements I might have for the job. TDM will almost instantly present me with all potential candidates for the job.”

Scott was an early user of TDM and, though his version was one of the first, he had little trouble installing it and getting it up and running. “When we decided to go to more than one computer accessing the same data-base storage, there were a few problems,” he says. “TDM was rewritten, in effect, to support multiple users, and we've had no problems with the new version.”

During its first year of installation, the system was used for little more than keeping track of job applications.

“This year,” Scott says, “we're taking a huge step forward in expanding the application of the data stored in the base. Each employee is listed according to number, salary and starting date. Using this information, we're executing the docu-

"The money saved by eliminating just one of the mainframes we used is enough to purchase a personal computer every month."

HANDLING THE MAILINGS: A PERSONAL ACCOUNT

Ed Coudal uses two true data-base managers in his day-to-day work as a writer, publicist and marketing communications consultant. Both have important features, especially for the very small businessman.

Coudal handles about a dozen clients and writes extensively for the personal-computer press. To keep track of income and expenses, he uses The Business Financial Advisor, offered by Omni Software Systems of Griffith, Ind. To handle client mailings, he uses a self-written program that gives him the manipulation flexibility that he found unattainable elsewhere in canned programs for the personal computer.

Both programs are written in North Star BASIC and run on the 64k double density, two-drive North Star Horizon machine, with a Soroc 120 terminal and a Diablo 1610 daisywheel printer.

The Business Financial Advisor handles a total of 1200 records on a 5¼-inch floppy disk, and can be divided into an income file and an expense file. Coudal's system allocates 1000 records to expenses and 200 to income.

Each record in the income file includes five fields: client, amount, reason, date of billing and paid/unpaid. Each record in the expense file includes: vendor, amount, reason and who is to be billed, paid/unpaid, and an accounting code for assigning the expense.

The program itself is menu-driven and will add records, edit or delete, search for any variable (such as unpaid billings), display aging accounts, display income and expense by client, display number of entries and the size of file remaining free, and display on one screen an up-to-date profit/loss statement with separate notation of unpaid billings and expenses, plus estimated tax liability to date.

If there is a drawback to the program, it is in the nature of the BASIC language that is used. When the data files become full, it takes as much as 60 to 90 seconds to search

and display any specific variable.

However, the mailing list manager alone is a true joy, Coudal says. Each record is made up of 12 variables, which can be specified to whatever the user needs.

The first eight variables are standard: first name, last name, company, address, city, state, ZIP code and phone number. The other four are used in his system to note circulation of the magazine, general type of audience, advertising space cost, and date of entry of the record. Others have defined the last four variables as credit rating, activity, type of business and remarks.

Like The Business Financial Advisor, the data file can be supplemented, edited, compressed and searched for specific variables. Let's say that Coudal is going to New York on a magazine feature. He can ask the mailing list to print out all records that have NEW YORK as the city record, and he will receive a list of all possible contacts, with phone numbers, that are in his file.

The mailing list that Coudal uses for a heavy equipment manufacturer similarly contains 213 publications. If he wanted to direct a mailing only to heavy-duty truck interest publications, he would tell the program to print out only those mailing labels with a HEAVY TRUCK in the audience field. He'd get 51 labels.

He also maintains a list of 463 daily and weekly newspapers in the Chicago area, including northern Indiana. But one of his clients is a soft-drink bottler who is prohibited by his charter from doing business in Indiana. For that mailing, Coudal commands a sort of the labels specifying IL in the state field. And the Indiana papers never hear of the Illinois bottler.

Keeping track of all the required tiny bits of information can tax the structure of any organization. But Coudal's approach to information control, using the data-base manager, offers another way to fend off the impact of Murphy's Law.

mentation that starts a person on the payroll and prints his identification card. We're printing out lists of various kinds, and using the information in a number of new ways, such as reaching into financial areas with the information available from that data base.

"I was able to isolate all the labor hours committed to various cost centers in our park and determine productivity. I use the data frequently for those one-of-a-kind types of analysis. It just gives us a management tool we never had before."

Keeping track of suits

Another example of a time-saving, cost-saving DBM system is that employed by a major East Coast petrochemical company to keep track of litigation, a common concern in the industry. This Fortune 500 company, according to Robert J. DeFelice, its manager of internal consultation, uses several Apple IIs for its legal applications.

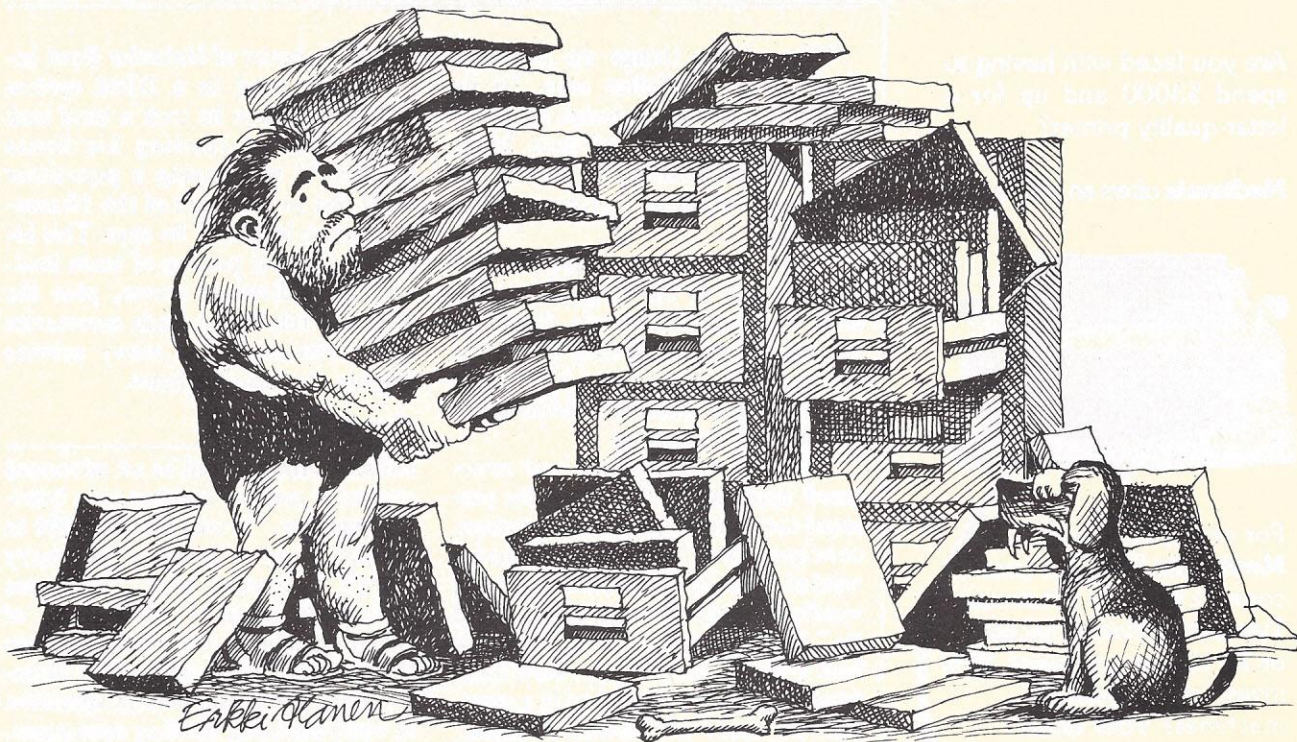
"Two years ago, before bringing in the DBM system," DeFelice says, "we tracked the law suits manually. There are certain big areas that we have to keep current on, such as status of each case and the costs involved. If you have a few hundred cases, that's a lot of record-keeping."

According to DeFelice, there were three major concerns in the selection of hardware and software: ease of use, capacity and the ability to generate reports easily.

After studying the available equipment and programs, DeFelice selected four complete Apple II systems, each with two 5¼-inch floppy disk drives and an Apple printer. To this, he then added a compatible PFS data-base manager and its companion document writer, PFS REPORT. Both systems are from Software Publishing Co. of Mountain View, Calif.

DeFelice says the system acts as a decision-support system and allows the legal staff instant access to all details of all pending litigation.

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CIRCLE 49

August 1982 PERSONAL COMPUTING 115

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BUSINESS

"One of the things we like best about PFS," DeFelice says, "is its ability to allow us to design and generate specific kinds of data bases from the original, to fit our needs exactly—without programming expertise."

These data bases might include listings such as the litigant in each case, who initiated the suit, the plaintiff, the subject of the suit, where it is in the court system, when it's due for a hearing and whether outside counsel has been employed.

"We took a disciplined and structured approach to bringing the personal computers into the department, concentrating on what the users needed, rather than preaching the wonders of what the equipment could do," DeFelice says. "As a result, we had a lot of people who were comfortable with the machines in a week, and no cases of 'terminal fright.' Software Publishing has furnished us with upgrades and has been most responsive to questions."

Since installation, his company has found other users for the legal department's machines. "We access our lessors by modem," he says, "and get all the stats we need on auto and rail-car rentals. These figures go into another data base, which is constantly referenced for comparison and use kinds of studies. We can also access the company's mainframe with our Apples and send programs down that require number crunching."

The power and performance of the Apples, DeFelice adds, is hastening the day "when every line manager and executive in this international corporation will have a personal computer on his desk. It's coming."

Watching the bowlers

On Chicago's busy northwest side, a forward-looking bowling lanes operator has similarly turned over an onerous statistics-keeping job to a personal-computer system and database manager specifically designed for bowling operations.

Bob Habetler of Habetler Bowl became interested in a DBM system last spring when he took a hard look at the cost of running his house leagues. "I was paying a part-timer \$800 just to take care of the 10 summer house leagues," he says. This included manual posting of team leaders and individual scores, plus the hassle of relying on team secretaries for statistics in the many private leagues that use his lanes.

Out of his league

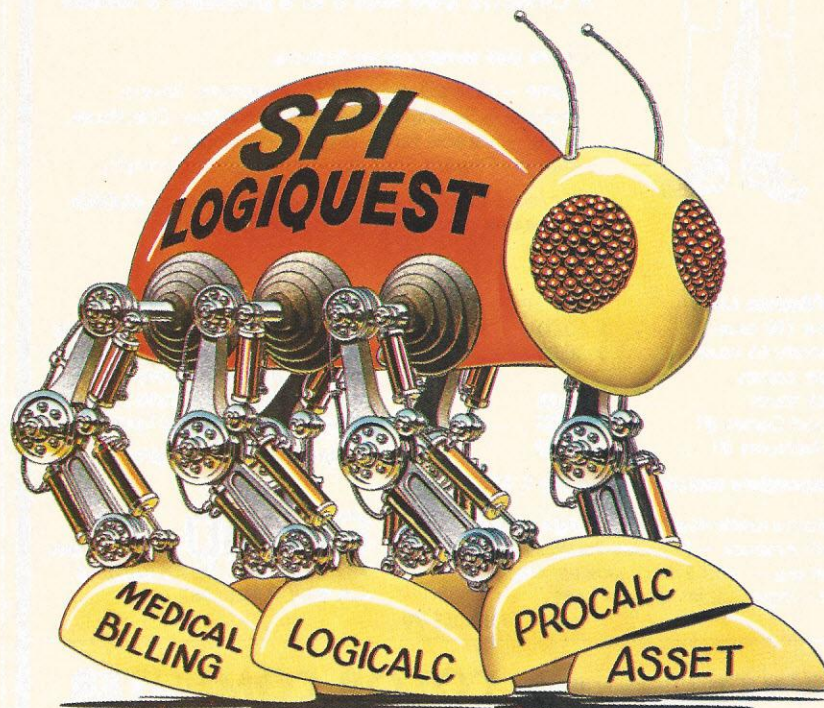
Habetler first looked at an advanced operation used by another area bowling operator. "It cost him \$20,000 to install, plus a service fee every month," Habetler says. "That was out of my league." After a bit of shopping, though, Habetler settled on the turnkey system offered by Data-Strike of LaCrosse, Wis., a specialist in computerizing bowling operations.

The hardware consists of an Apple II with a Zenith 12-inch monitor, two 5¼-inch floppy disk drives, an Epson MX-80 printer, and an additional numeric keypad. Habetler dedicates one data disk to each league with a backup disk stored off-site. The program prompts for all input, then accumulates and stores the data. It checks input for correct three-game totals, computes handicaps automatically, and produces final weighted and sorted printouts for posting.

"Just the automatic sorting is a joy," Habetler says. "We used to post the standings on 3-by-5 cards hanging from hooks. Do you know what a pain it is to move everyone around every week?"

The total package, including installation and training, cost Habetler "about \$5000." But he expects to get the investment back quickly through elimination of costs such as that \$800 clerk, and by charging the private leagues that use his lanes a nominal fee to keep their records.

"We can update an entire league in 20 minutes on the computer," he says. "It used to take an experienced



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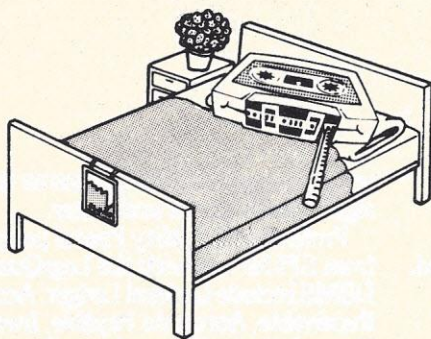
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CIRCLE 80

BUSINESS

person, usually me, about two-and-a-half hours to bring a league current after a night's activity."

Best of all, Habetler says, "Data-Strike has furnished me with two updated versions of its program. The account person drops in here every two months or so just to see how things are going and to see if I have any questions. That's the kind of service I want."

Then there's the case of the analytical laboratory at National Starch and Chemical Corp. of Bridgewater, N.J., a subsidiary of Unilever, that was faced with the long-term filing and reference of more than 1000 sample analyses every three months.

"We must maintain immaculately detailed and thorough records of every test," explains Dr. Robert Holzer, a research associate at National Starch. "It is very cumbersome to go to notebooks and dig out the data, which is the way we used to do it. There's just too big an accumulation of data that must be maintained over too long a period."

Freedom and flexibility

In the past, Holzer's lab at National Starch, a primary manufacturer of products such as starches, adhesives, and flavors and fragrances, had tried various manual methods of filing and retrieving its data, including card files, but nothing really worked. The biggest stumbling block was always the need for fast availability of the data as a reference against current laboratory work.

About two years ago, handling such an accumulation of data on personal computers became feasible as the machines became more powerful, Holzer says. He then began a study of available data-base managers that led to the installation of the Jinsam data-base manager (version 8.0), from Jini Micro-Systems Inc. of Riverdale, N.Y.

The single-user system runs on a Commodore CBM 8032 with a Commodore 8050 two-floppy drive system

and 8024 high-speed printer. "We liked a lot of things about the Commodore, compared to other similarly priced machines," Holzer says, "but one of the most important was its integral IEEE-488 interface, which allowed us to connect directly to a lot of our existing equipment. The total package—hardware and software—cost \$7000."

The system was installed in late 1980, and the biggest problem at start-up was the manual that came with it. "It was poorly written," Holzer says. "We had to fight our way through it." Since then, however, the manual has been rewritten and improved substantially.

Each record in the data base is made up of fields for the month in which the experiment was run. These fields include: division, group within the division, individual requester, the type of work (research and development or technical service), project number, man-days on the project, identification of the individual conducting the analysis, primary location of notebooks containing the written data, and, finally, "a huge field for the data—the results of the analysis itself."

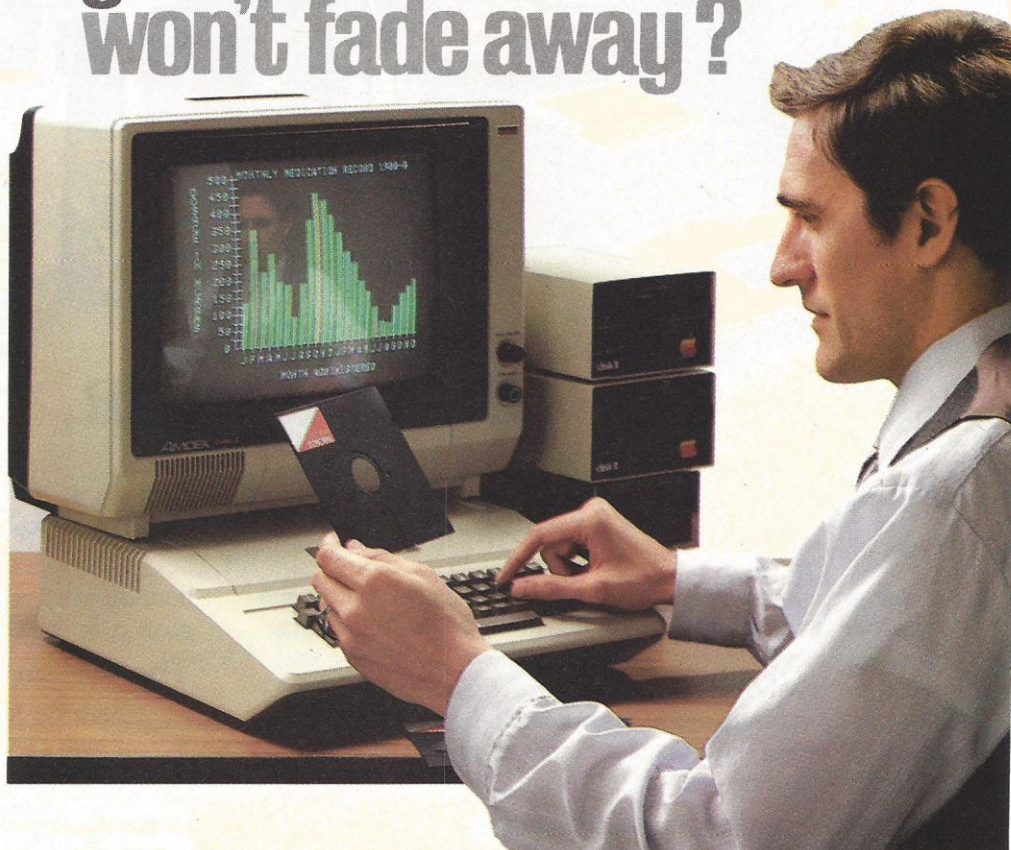
Finding methyl-what?

One of the things that Holzer likes best about the Jinsam data-base manager is that its records can vary in length, and individual fields within each record can be of any length. "There's no pre-defined field or record length," he says, "and I'm not aware of another data-base manager that gives you that freedom and flexibility."

Holzer is currently installing the latest update, version 8.2, which allows global search of the entire data base. "Let's say," Holzer explains, "that I'm looking for a methyl match, but I'm not sure—methyl-what? I can simply type in 'methyl' and Jinsam will present me with each record dealing with methyl-anything. I can

(continued on page 137)

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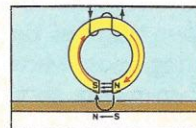
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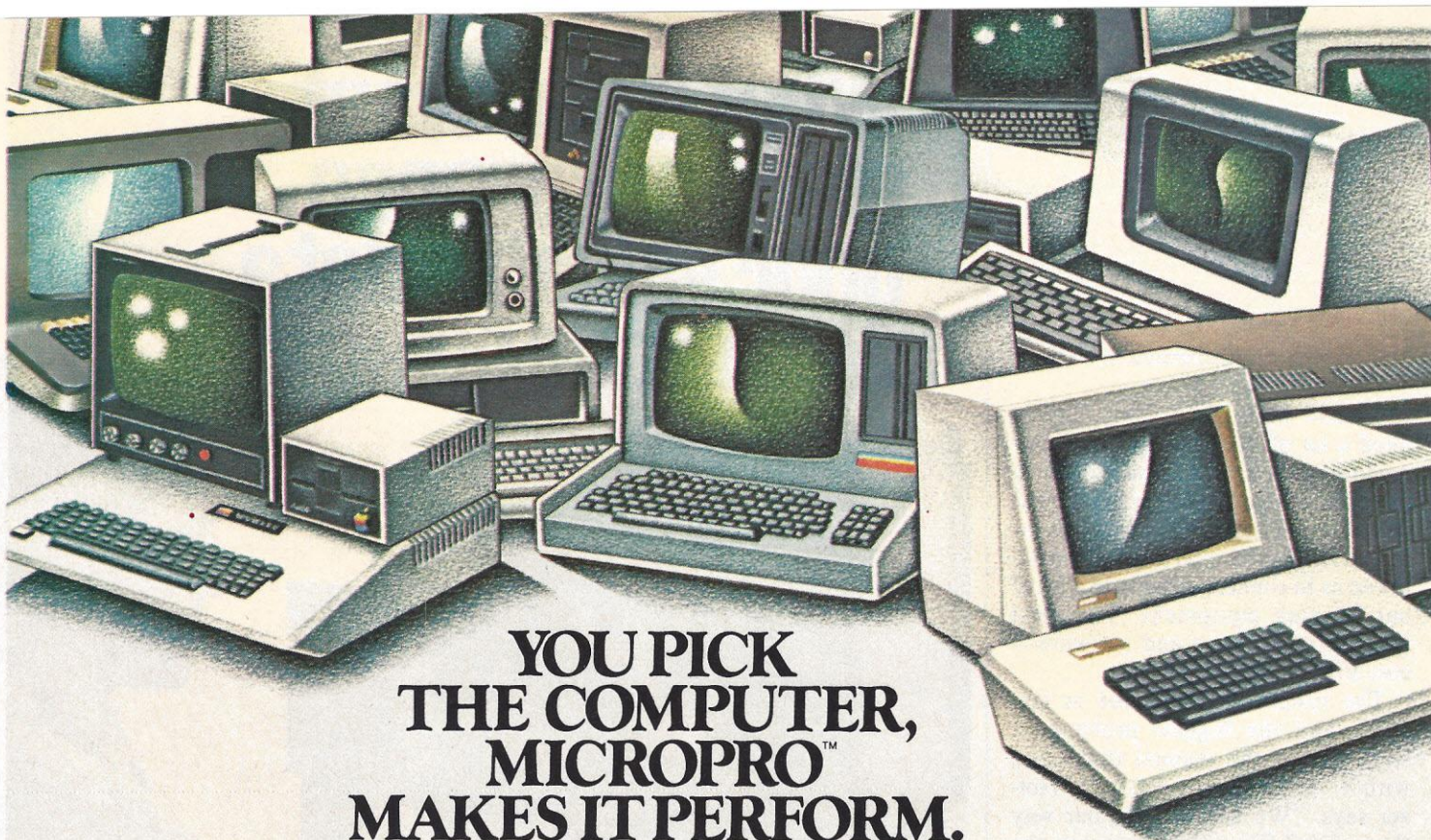
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INTERVIEW

INTERVIEW WITH BILL TURNER

(continued from page 32)

cycle of the system itself has to grow with the family for five to 10 years. *You've been talking about a 10-year life cycle, so the next question that comes to mind is this: If a person goes out to buy a home computer, how does he know that the computer that he buys, yours or anybody else's, is the one that he'll really want to stay with over 10 years? How does he know that there isn't going to be a giant leap in technology five years down the road that is going to obsolete what he has?*

Turner: There's a phenomenon that's always going on in electronics that says to the consumer, "Maybe I shouldn't buy today 'cause next year's product will be that much better." It's a phenomenon that you see in automobiles, in television sets, in any kind of high-technology item. But I think there will be two reasons why people won't delay in this matter as they have in others. The first reason is that this is a product that has different meanings and stirs different interest levels in each particular family. Let's say your younger child has a need today in computerized education. If you don't buy a home computer that can help that child today—if you wait until next year—there's time lost that you can never gain back. If one of my prime motivations is to have my children computer literate, and I delay my purchase for two years, then I've lost two years of computer literacy exposure for my child—forever. That kind of motivation will drive people to buy more today and less tomorrow.

We've talked a little bit about the future, but what exactly does the future of the home computer, the personal computer, look like to you?

Turner: We think it's extremely bright. It's going to be dynamic. It's going to move at a faster pace than ever before. In 1981, the total U.S. sales of home computers came to approximately \$100 million, or approxi-

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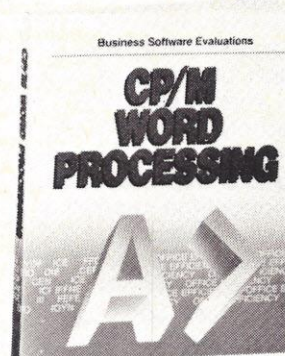
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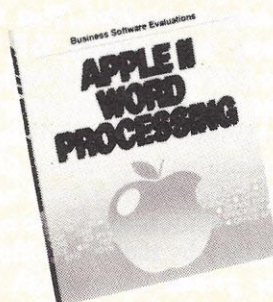
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INTERVIEW

mately 200,000 units. We think that business will expand in 1982 to \$500 million in sales on anywhere from 700,000 to 1 million units. We think that in 1985 those figures will double or triple again. The acceleration in this business appears to be going at a much faster pace than before.

We're rapidly approaching the point, I believe, where consumers will begin to think that every home should have a computer; that every computer does have a home; that if you don't have a computer in your home, your children will be not be in tune with society.

When we reach that point—say, five or 10 years down the line—what will the computers be like?

Turner: There are several dimensions to computers, one of which is price, and the price-of-product that I've been talking about today is in the \$300-to-\$500 range—for a computer that you can take home, as is, and plug it into your TV with no additional purchases required. That type of computer will probably fall into the under-\$100 range in the next five years. And included in that price will be all the things that you buy today as peripheral equipment, such as printers, telephone connections and so on. So where computers today are being used primarily by the more affluent, they'll be priced low enough five years from now so that virtually every family will be able to have one in their home.

Once computer consoles are installed in a good number of homes, the opportunity for vendors is in the after-market. And there, I believe, we will see a parallel to today's record business where every family will have a console, and family members will use them according to their age and interests, just as they use their stereo sets right now. That means there are going to be thousands of software packages to choose from, manage and inventory. We think the communications application—in terms of banking at home, shopping at home,

ordering from home, communicating between homes or between homes and businesses—will all be an innovative use of the computer. We think that voice synthesis and voice recognition will be additional tools which will make the capabilities of the computer go even further in the home.

The dream of the home-computer manufacturer—where the home computer controls all the security devices, all the appliances in the home—certainly will become a more practical application. Today we have the technology to do it, but a \$25 interface for a \$10 toaster is not practical. And the cost of re-wiring a household after it has already been built is not practical. However, if you view what is happening in the communications world—where wireless communications are becoming more and more significant, and costs are coming down at a rapid pace—I can see home computers 10 years from now having a central unit with a console in every room, just as you now have a central furnace unit with ducts going to every room.

How will this affect our society as a whole—the way we live?

Turner: Well, let's take a look at what society will be doing to the home user outside the home. Technology has had a growing influence on the average household every year. Witness just the automobile. Some cars today come automatically with a speed cruise control. They come with computer controlled fuel systems. And even though the average user who buys a car doesn't understand all those things, he is influenced by them. Likewise, the movement to banking from home, shopping from home, data-base services that are available from your home—all the things that we have been doing traditionally using the telephone—will be just as convenient and comfortable to the user 10 years from today as the telephone itself is as compared to its predecessor, which was Morse code. Ten years from today, rather than

INTERVIEW

going to a bank teller to ask him your balance, you will certainly call it up from home and that will be the normal way, and people won't think anything of it.

Beyond that, we'll be making our society more productive; we'll be making our society more cost-effective. Rather than having hundreds of individual devices to do things, we will have one thing that does them all. Computer communications, computer education and computer activity in general in the home will be as significant in the 1990s as computer productivity was to business in the '60s and the '70s. *Will there be any dangers in all of that?*

Turner: I seem to recall that in *Nineteen Eighty-Four*, George Orwell said that by then someone would turn on our communicator and then make us do calisthenics in our homes. And with a home computer connected to a bank, it would be a simple step to connect it to a central government office. So is there a problem here, and should people be concerned about it?

Oh, I don't think so. Our whole democracy stands for individualism in a fashion that is orchestrated essentially by each of us—it's a matter of convenience as opposed to group control. Some people would argue with that viewpoint. But what we are offering here is a delivery system of services, not a controlled delivery of those services.

What we are going to find, though, is that vendors are going to offer more cost-effective opportunities, using electronics such as personal computers in the home, that will give every consumer an opportunity to do more, better or different. And to that end, I think the home computer will be viewed by most people as a productivity element to give them more discretionary time and, coincidentally, more time with their families. And I, for one, can hardly wait for the improvements in life style that will result.

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CIRCLE 64

ESSAY

PRIVACY AND VIDEOTEX

(continued from page 38)

users of personal computers, the ones who can, today, take advantage of videotex services, if only on a limited scale for now.

In this area, as in so many others, we have the clout to make some profound changes in this society and, by extension, the whole world. We form the market for services that the vendors will provide. If people using personal computers hadn't wanted a machine that could do the things that today's computers can do, the product would be very different than it is. If we don't care whether our private lives are protected from outside scrutiny, then they surely won't be. But if we demand that both industry and government keep their collective noses out of our collective business, they'll do it.

It'll be tough. It seems that each time there is a chance for the few to abrogate the rights of the many, the few will just go right ahead. We, who understand the benefits that can be ours from the melding of technologies like personal computing and videotex, really owe it to the rest of this society to keep our eyes open and our fingers on the trigger, so to speak. We have to remember that eternal vigilance is the price of liberty, and that the non-vigilant are likely to lose the very benefits they expect to gain. It's happened over and over again. Those who say that it couldn't happen here should check with people like themselves around the world who felt the same way, but found out differently.

We know it won't be easy to safeguard our individuality in the face of new technology, History shows us that. But wouldn't it be a shame if we didn't? Wouldn't it be too bad if this terrific tool we have for enhancing individual excellence—personal computing—were turned into a tool for institutionalizing collective drabness?

Wouldn't it be too bad if Orwell were right after all?



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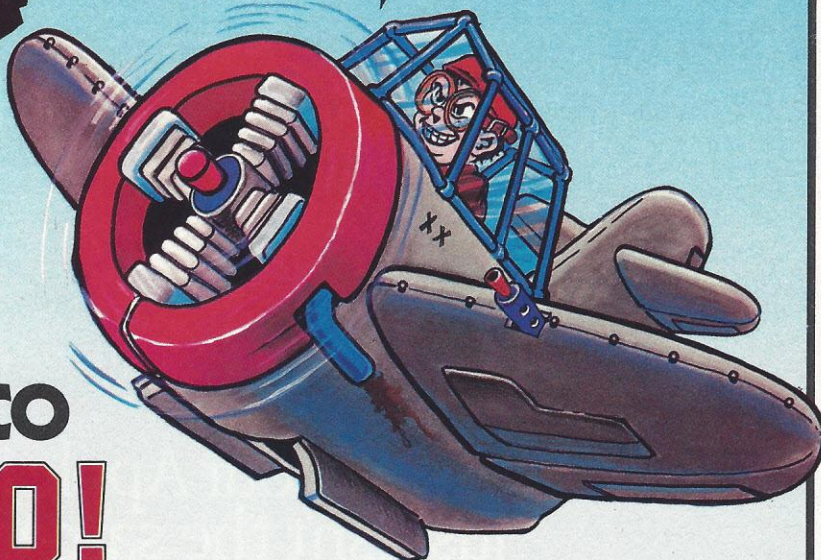
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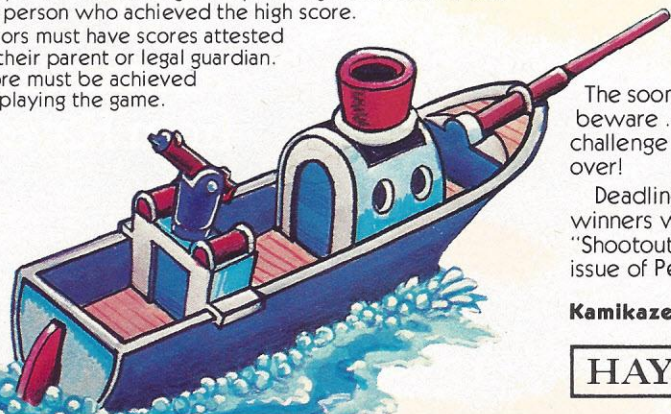
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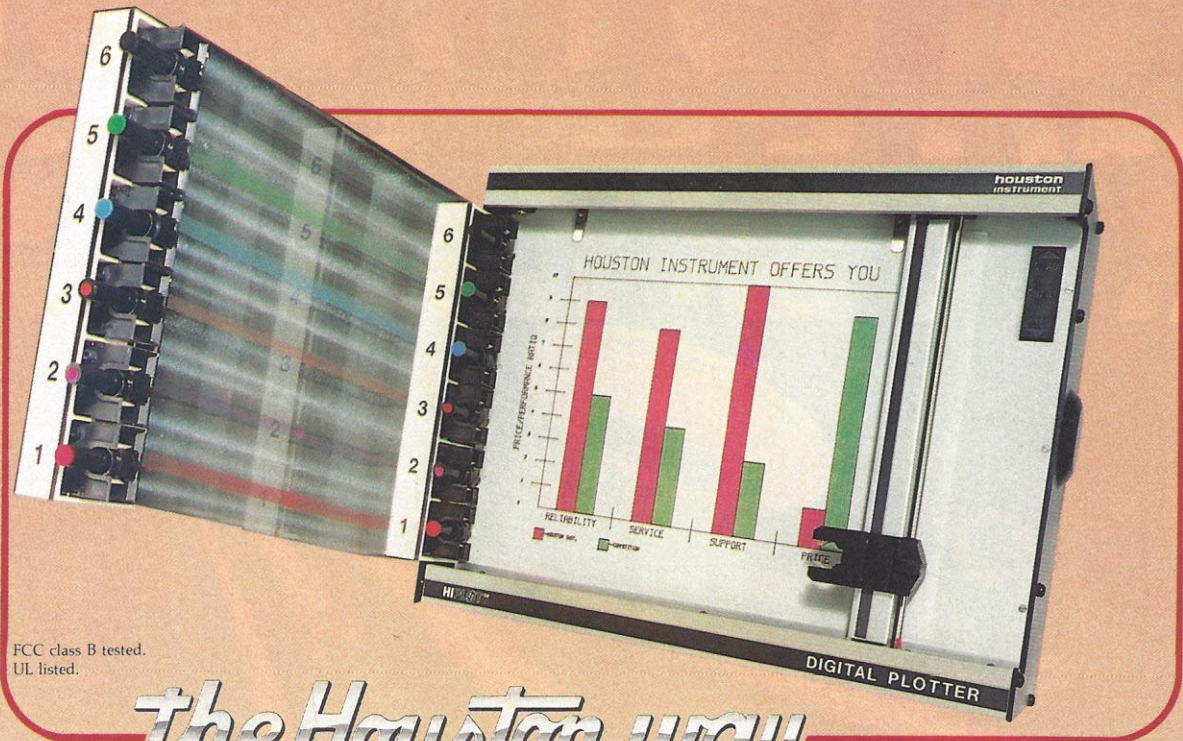
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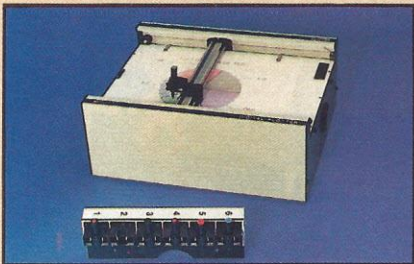
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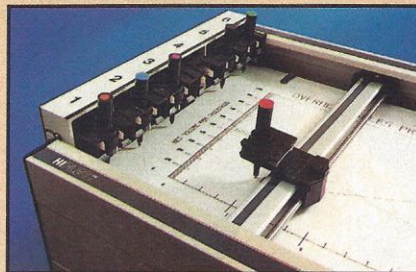
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PROFESSIONAL/ MANAGERIAL

BACK TO THE SOIL

(continued from page 49)

description of a hobby farmer.

Accounting is his main business. Fagan handles 18 different sets of books for farms and ranches in the area, including his family's 7500-acre ranch with a 1200-head herd. "The cows," he explains, "are a tax shelter for city people who don't know which end of the cow to milk." Two other ranches he handles have 108,000 acres between them.

Two years ago, Fagan bought an Apple II with dual floppy disk drives and a Centronics (Hudson, N.H.) 739 printer. "I paid \$5000 for the whole shootin' match," he says. "I wanted to start out with something just to kind of get my feet wet and learn something about computers. It's pretty good. With controller software, I can handle two sets of books. But the Apple doesn't have enough disk storage space. So I'm buying Altos (San Jose, Calif.) hardware with a CPA client software program that can generate the types of reports I need." Some of the fancy bookwork he needs to do includes figuring oil and gas royalties, computing investment dividends, and breaking ranch sales down by class of livestock for tax and management purposes.

Fagan says he had only minor problems with his Apple. "It took me a pretty good while to set up my chart of accounts, and I lost some data on the disks," he says. "I was running monthly information and in the middle of it, it just quit." Repositioning the CRT and disk unit solved the problem. There was only one disk drive error, but Fagan's "grandfather, father, son" disk backup prevented any data loss. "

The Apple enabled him to straighten tax returns previously done on a mainframe system. "I cut the time on the tax returns substantially, probably in half," he says.

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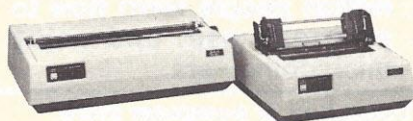
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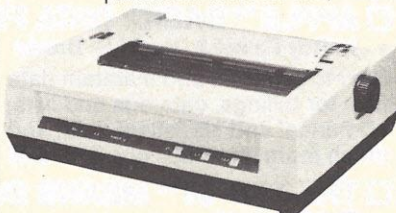
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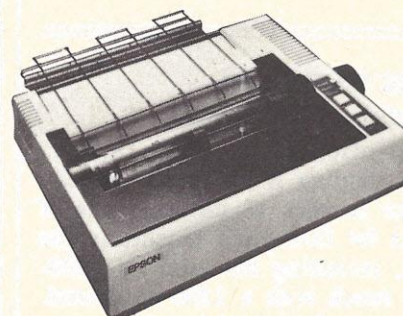
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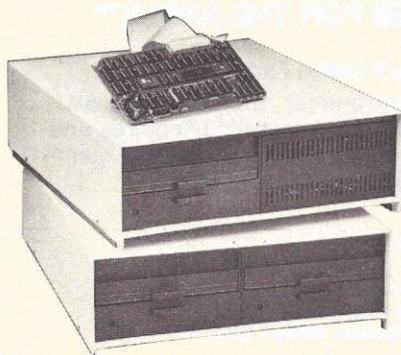
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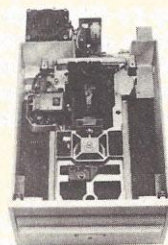


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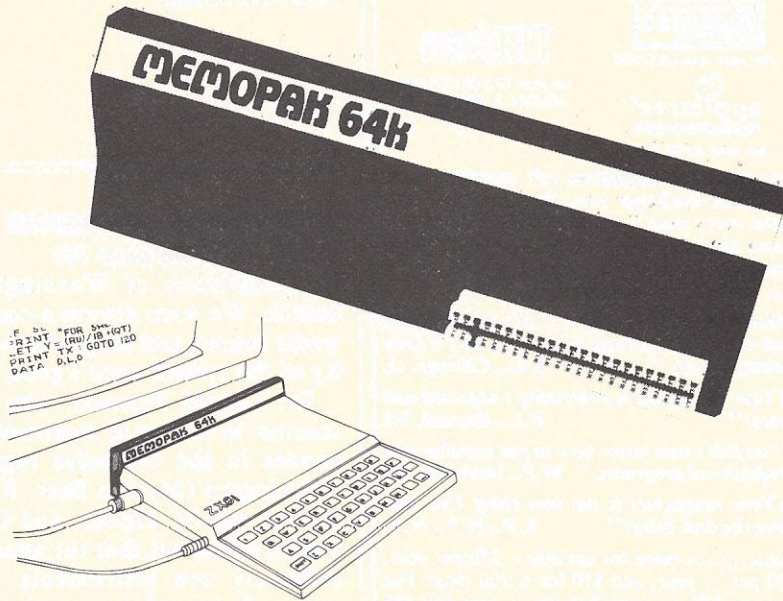
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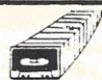
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CIRCLE 61

ADVANCED

INSTRUMENTS OF SCIENCE

(continued from page 80)

the University of Washington in Seattle. We were always a couple of weeks behind, and the predictive ability of the system wasn't good."

Dr. Donald Peterson, who is the scientist in charge of monitoring volcanoes in the Cascades region of Washington (Mounts Baer, Rainier, Adams and St. Helens, and Glacier Peak), points out that tilt meters are relatively new instruments. Along with techniques for measuring a volcano's vibrations, gas emissions, magnetism and geodetic displacement, they form an effective means of studying volcanic activity. But the monitoring system must take other factors into account. "Of course," he admits, "we have built into the computer program various compensations for the raw data from the mountain. The computer must counteract or make adaptations for diurnal changes and other matters like temperature and moisture variations.

"Other volcanoes—such as the one in Hawaii—are monitored constantly for seismicity. However, this is the only one I know of that is monitored constantly by computer-assisted tiltometers."

Industry hasn't lagged behind academic labs and government agencies using the personal computer for instrumentation control. KVB (Irvine, Calif.), an engineering firm specializing in combustion technology, has made computers an essential component of the pollution monitoring devices it builds. The computers operate in two-ways: They determine the amount of effluent going into the atmosphere, and they measure the different types of gases present so a client firm can evaluate the efficiency of its combustion process.

"Our firm," says Joe Schwartz, KVB assistant marketing director, "has built pollution monitors for the last 10 years, and we have used computers to control the monitoring system and produce data for the last

three years. I'm somewhat nervous about interviews on our technology. We've worked a long time on these computer-assisted monitors, spent a lot of money, and developed extensive software. I can't go into much more detail other than to say the computer operates all the valves in the system, calibrates them and records and crunches the data. Finally, the computer provides daily as well as quarterly reports."

The system built by KVB is extensive. A typical installation with its probes, a gas analyzer, and a data acquisition element runs between \$200,000 and \$300,000, and often the system is put up in several places in a large power plant or chemical factory. The computer, a Cromemco, is roughly a \$10,000 component in this pollution-control device.

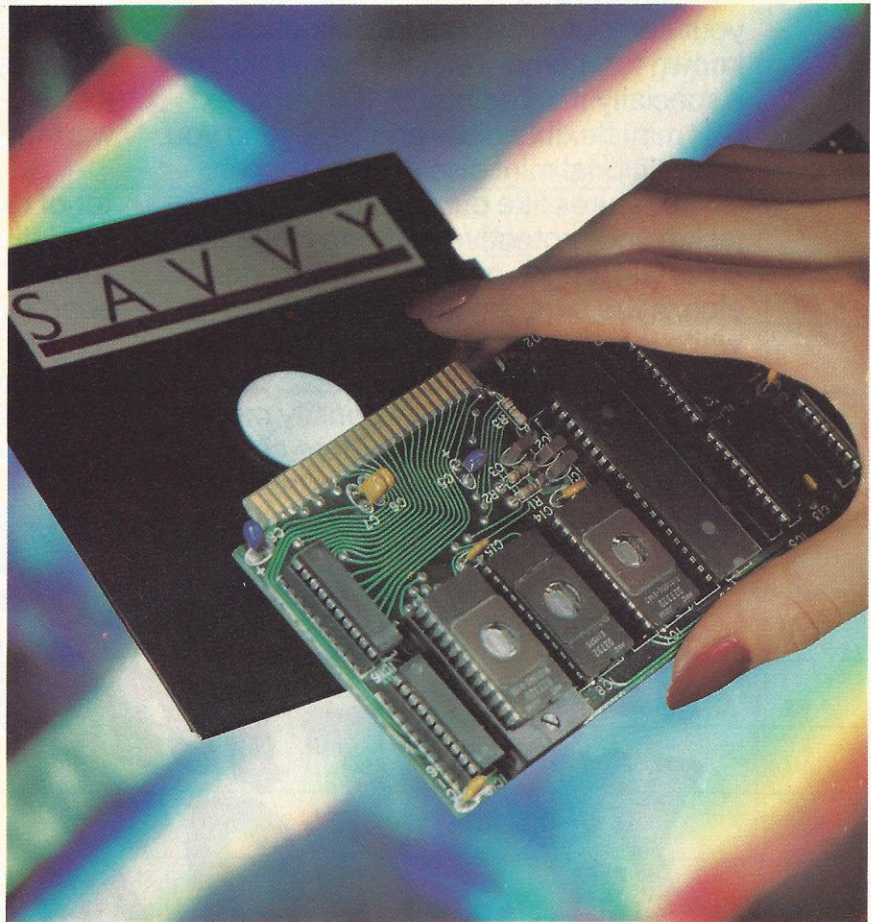
Unlike many forms of process control, this application usually operates 24 hours a day for 365 days a year. Because a power plant remains constantly on-line, the pollution monitor and its computerized brain are constantly in action.

Forecasting the future

No one can tell where the development of technology in either the physical or the life sciences will go in the future. What's more, no one can say in very precise terms what the application of personal computers has meant to the different disciplines and scientists using them.

One can apply some yardsticks for its success: DNA is so many dollars cheaper, and we can predict the explosion of a volcano now within 30 minutes' time. But these aren't measurements the researcher or true scientist is interested in. Perhaps Baylor's Dr. Aune puts the matter most succinctly. "The personal computer has greatly helped me in studying interactions between macromolecules," he says. "But these applications haven't brought my projects any closer to conclusion. Now I simply pose more complex problems." □

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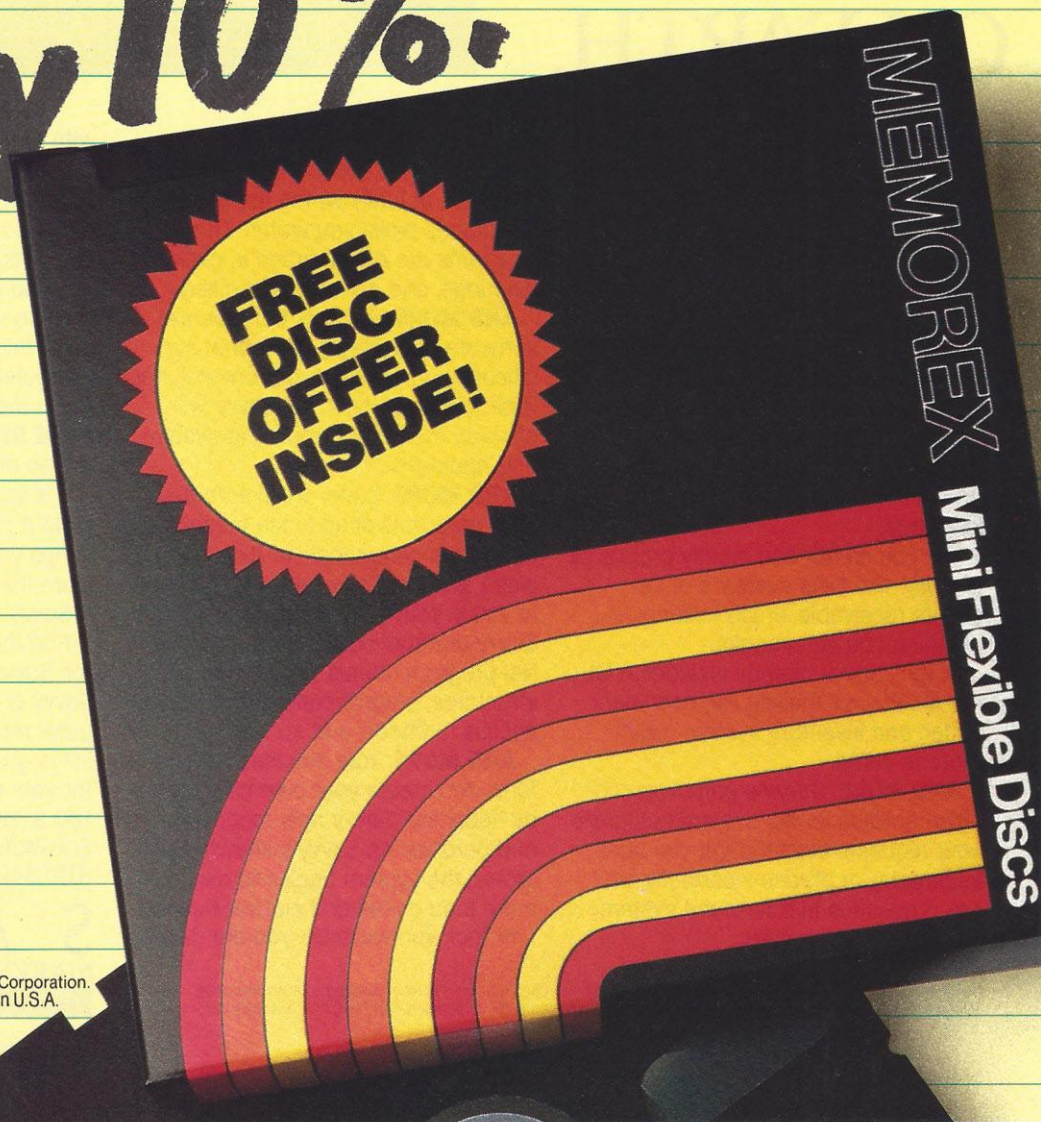
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CIRCLE 106





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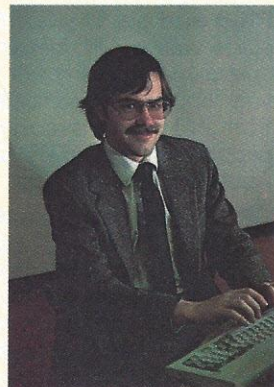


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CIRCLE 62

"A properly designed and fitted DBM can offer one of the most valuable tools in all of personal computing."

ORGANIZE WITH DBM

(continued from page 119)

then select the ones I want to look at. It conducts and displays the global search of 1000 records in less than two-and-a-half minutes."

Keeps you moving

On another front, energy experts tell us that for every 100 cars forced to stop at a traffic light, a gallon of gas is wasted. The job of traffic engineers is, in part, to keep those cars moving, which accounts for the personal computers and two data-base managers now being used at Barton-Aschman Associates Inc. of Evanston, Ill., one of the world's leading transportation consultants.

Barton-Aschman deals with tasks such as auto flow control, designing and implementing mass-transit systems (both bus and light rail), and city planning involving signal systems, parking, environmental concerns and the like.

Senior associate Dennis W. Strong says that the firm's interest in personal computers and data-base managers began to grow in early 1980 when the firm realized that its use of outside data processing had reached a plateau. "We were in a maintenance mode in terms of data processing," Strong says, "and worse still, the service bureaus we used were faltering."

A study conducted by Strong indicated that the firm had two types of users for computers: the modelers who designed the "grand plan" large systems, and the "nuts and bolts" analysts who studied such things as traffic flow through an intersection. Both groups were relying on outside sources at service bureaus, which were often running on high-end personal computers.

As a result of that study, Barton-Aschman installed personal computers to handle all the smaller computer work. It also uses those machines to access the bigger mainframes used by the system modelers.

"We prepare the programs to run

HORSE BREEDER CORRALS HIS DATA BASE

Computerized dating services nowadays hardly qualify as news. Lovelorn Americans have been turning to digital matchmakers for years. But when someone uses a computer to match horses instead of humans, that's news—and that's what Brad Baker is doing at Moondrift Farms, a Colorado horsebreeding ranch, with the help of data-base management software.

Baker came to Moondrift last year to help his mother, June, who has owned and operated Moondrift for seven years. Her 50-acre spread in Fort Collins, on a mile-high plain at the foot of the Colorado Rockies, is used for horse training and riding lessons, besides breeding.

But breeding horses is Moondrift's mainstay and June Baker's passion. She keeps more than 60 horses on Moondrift, all of them Morgans, a sturdy and versatile breed of light horse still popular on cattle farms.

At Moondrift, breeding is done by artificial insemination. "First, a mare's owner selects a stallion to sire a foal," June Baker says. "Then, we 'expose' the mare to the stallion—we call this 'teasing'—to see when the mare goes into estrus [heat]. But we don't let the stallion 'cover' the mare. Instead, we collect semen from the stallion and artificially inseminate her."

Sound simple? It's not. Settling—or impregnating—a mare is a delicate process and can be time consuming. It may take months; in some cases, it may not happen at all.

To increase the likelihood of success, detailed information is kept on all horses who come to the ranch. For example, when a mare comes to Moondrift to be settled, her past history is carefully noted. "We want to know when she was last in heat, what she's been fed, the history of her foaling, how many times she's been bred to settle, and even a little bit about her personality," says June Baker.

Even a professional archivist might quail at the task of organizing so much information, and by the end of last

year, June Baker was almost adrift in a sea of notebooks. "My husband said there had to be a better way," says June. "He suggested we get a computer. Brad had experience, so we asked him for help."

Brad was working as the controller of a construction company, where he had gained computing experience by working on the company's TRS-80. He agreed to come to Moondrift.

Arming himself with an Apple II with two disk drives, an Epson MX-80 printer, and Software Publishing's PFS data-base management software, Baker began to make order out of chaos.

"PFS has just been super," says Brad. "I've set up several programs, the first of which is a total medical history of all our horses."

"Then, I have a program for mares—really everything we need to know in connection with breeding. I'm working on a similar program for stallions. We have a sophisticated laboratory on the premises, so we'll want to know things like the motility of a stallion's sperm."

Mare owners will be able to check the background of any stallion they are interested in. For example, a mare's owner might want to breed her with a descendant of a certain sire. At the push of a button, the names of all such horses may be recalled.

And it's exactly this rapid recall capability that has been so useful at Moondrift. "I can recall information in about 30 or 40 different ways," says Brad. "I can get a complete price list"—Moondrift's Morgans fetch anywhere from \$35,000 to \$50,000—"or I could call up the names of all horses who need their teeth worked on."

Brad is also using PFS to stay abreast of show performances by Moondrift horses, and to keep track of work that has to be done on the farm's equipment.

"We're enjoying and learning," says June Baker. Adds Brad, "It's done wonders for the way we do business."

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on the big service bureau mainframes and send them over intact," Strong says. "Just that has cut our main frame service bureau costs by at least 20 percent, while reducing the small service bureau costs to zero."

Strong is reluctant to discuss actual dollar savings, but he notes: "The money we saved by eliminating just one of the six service bureaus we formerly used is enough to buy us a new personal computer every month."

The computer Strong selected is the Godbout Compupro system, an S-100-bus CP/M machine with 64k of static memory. Each unit is equipped with four double-sided, double-density 8-inch floppy disk drives for mass storage. The drives give the user 1.2 megabytes per disk, which was the size of the stored data bases available from the service bureaus, and with which the Barton-Aschman staff.

The software used in part is dBase II, which is offered by Ashton-Tate of Los Angeles, Calif. Strong considers it "a very well-done and very capable" data-base manager.

Barton-Aschmann has further developed a data-base manager in-house. This package, called TED (Traffic Engineering Data base), is partially based on public domain software. It is a free-form, interactive modular program that encompasses sort, search and scope (search for a number of simultaneous variables), which Barton-Aschmann is considering distributing.

Looking ahead, Strong says the company is now studying the possibility of integrating all data on a hard-disk system. But he's looking even beyond that. "My goal," he says, "is for everyone to have his own personal computer, accessing his own or a central data base, in his own office. Now, our users are coming to me and telling me about new uses they are discovering for the units. The mystery disappears when they have direct access to the whole system."

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SURVIVAL GUIDE TO COMPUTER SYSTEMS

WILLIAM E. PERRY
CBI PUBLISHING COMPANY, INC.
BOSTON, MA
253 pp., \$17.95

"The probability of something going wrong in data processing is directly proportional to the

severity of the problem. The more serious the consequences, the more probable that the computer results will be wrong." So says William Perry, author of *Survival Guide to Computer Systems*. So, if readers are looking for guidance on how to cope and survive attacks of Murphy's Law, they should peruse the book.

Survival Guide is just what its name implies, a book designed to focus manager's and computer user's attention on the unseen factors that

cause system failures. "Good systems don't just happen," Perry writes. "They must be planned in detail so that each procedure in the system is defined clearly."

In addition, the author emphasizes that all too often it is the lack of communication between people that causes the problems, not the computers. According to Perry, only people make mistakes, and he offers many recommendations on how to overcome all types of errors. "The importance of people is understated," he says. "Once computers are installed, there is a tendency to down-play the role of input personnel and users of the systems. In reality, these people make or break the automated system." Perry also believes that one of the chief causes of systems errors is poor communications. "When communications break-down," he says, "systems often crash shortly thereafter."

One of Perry's suggestions for improving communications on all levels, and thereby increasing productivity, is to involve the ultimate users in all steps of the systems' design, implementation, maintenance, operation and control. But, the systems designer must first identify the tasks within the system that require the involvement of people.

The author also says that the continual education of all individuals involved in the automation process is necessary if the system is to operate successfully. Writes Perry: "Once people recognize how their functions fit into the total systems concept, they can begin to appreciate the importance of their jobs. With this understanding, clerical workers react positively to new situations."

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of *Survival Guide To Computer Systems* is its 50 "Computer Survival Rules" developed by the author. Many readers will want to have several of these rules printed up and placed in strategic locations—such as on the desks of systems designers and programmers—to remind them how they can best survive with a computer system.

One survival rule states: "Systems are built by people for people. If systems don't serve people, they are useless." Perry also points out that "if a system displeases people, people will displease the system by not following or by breaking the system's rules. Be aware of this survival threat." And, "if you want to be sure data are accurate and complete, check, recheck, cross-check, and back-check. Even then things may go wrong."

Crystal ball gazing on the future of computing

COMMUNICATIONS TOMORROW: THE COMING OF THE INFORMATION SOCIETY

EDITED BY EDWARD CORNISH
WORLD FUTURE SOCIETY
BETHESDA, MD
160 pp., \$6.95

Communications Tomorrow is a collection of recent articles from "The Futurist Magazine" covering all areas of communications and predictions for the future. Among the many subjects discussed in the book are the various and potential uses of personal computers, video cassette recorders, videodisks, electronic newspapers, cable television, interactive television, direct satellite to home broadcasting, citizens band radio, and the movement of libraries away from traditional books to become "information brokers" and media centers.

A few interesting predictions in the book are that by the end of this de-

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cade, 20 percent of all American households and a far greater percentage of businesses will own a computer, which "represents 30 times the number of computers in the world today." And by 1990 a household with three computer terminals "may be totally unremarkable." Another author maintains that the ability to program and use personal computers "may be as important as being able to read, write, type, drive or use the telephone. Nothing since the invention of writing, including television, has made as big a change in the way people learn and live as the computer will in the next two decades."

One of the specific uses of personal computers, illustrating that many of the future problems are not technological but legal and political, concerns the use of home computers for interstate gambling. In the article "The Home Computer Terminal—Transforming the Household of Tomorrow," Hollis Vail, audio chairman of the World Future Society, writes: "Bill and his friends—Alan in Cleveland, Robert in Atlanta, Lester in Denver and Henry in Seattle—settle down for an evening of poker. Bill is particularly anxious to play this evening, for he has added a probability subroutine that he thinks might help him make his bets." Using this scenario as a starting point, Hollis says that there are still many questions that must be answered about the legality of interstate (and intrastate) gambling via common carrier.

As a whole, *Communications Tomorrow* offers an exciting look into the near future of telecommunications, but it often fails to provide any realistic cost estimates of these marvelous gadgets and services. In one article, for example, George Harmon, a former president of the Micrographics Association, states that micrographics technology may cause the return of the 25 cent book. He writes: "Microfilm, when combined with computer technology, can



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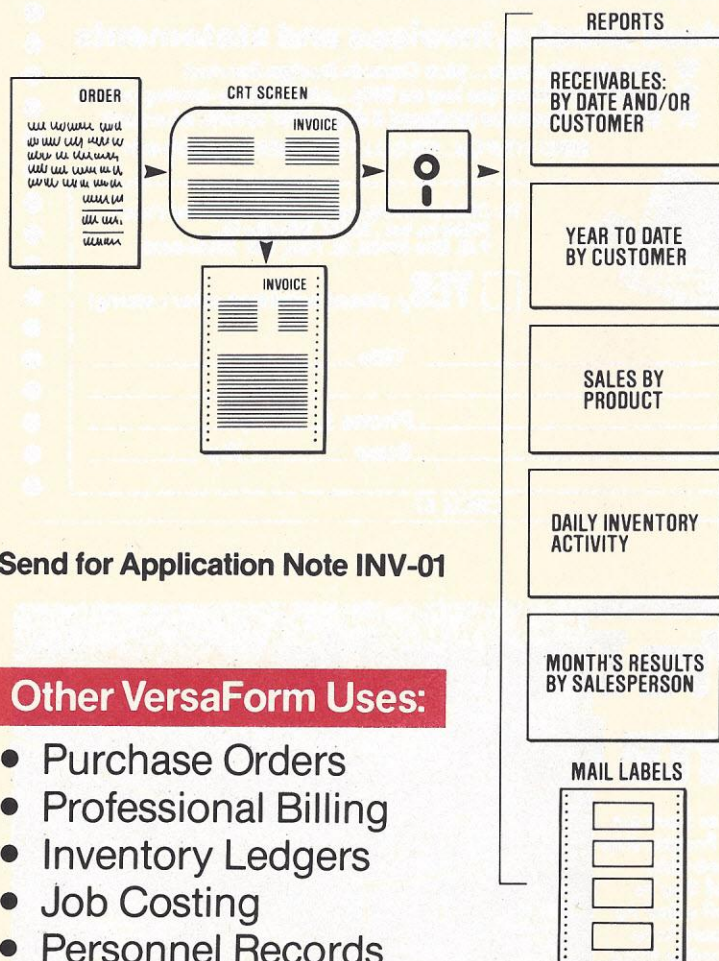
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Well, perhaps, but will authors spend years writing "great American novels" on their personal computers if the books will sell for only 25 cents each, at retail? Unfortunately, it's unlikely, and it seems that the authors in this book have let their enthusiasm and imaginations for all things technical cloud their judgments. Remember: There is no such thing as a free lunch, or a 25 cent book. No matter how advanced a technology or product may be, if it isn't profitable, no one—except maybe the federal government—will want to market it.

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TRADE SECRETS: HOW TO PROTECT YOUR IDEAS AND ASSETS

JAMES POOLEY
OSBORNE/MCGRAW HILL
BERKELEY, CA
250 pp., \$19.95

Trade Secrets can be the most valuable assets a company owns, and knowing how to protect them can put the firm a giant step ahead of its competition.

James Pooley, a California lawyer specializing in proprietary information, says that most businesses are woefully negligent when it comes to trade secret identification and protection, "the two initial steps required to turn those assets into dollars." More importantly, he maintains: "Several of the largest high-technology firms in the Silicon Valley still do not have adequate programs to



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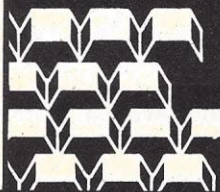
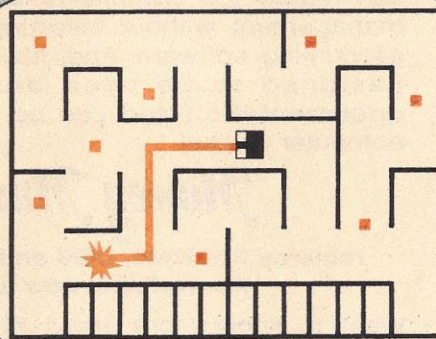
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CIRCLE 76

August 1982 PERSONAL COMPUTING

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BOOK REVIEWS

protect their trade secrets. If you don't, you are at best being ineffective; at worst, you run a substantial risk of losing your most important assets."

Pooley says proprietary information is generally defined as "commercially useful ideas" which must, at least, not be generally known. This proprietary information includes both technology and business information such as a machine, designs, formulas, or a method of manufacture. Yet, the author emphasizes: "All patentable matter falls generally within the 'technology' category of proprietary information, but the reverse is not true. In fact, an enormous universe of ideas (such as know-how) is not patentable, but can qualify as proprietary information."

In *Trade Secrets*, Pooley examines the important differences, advantages, and disadvantages of the three primary methods of protecting a firm's proprietary information: patents, copyrights and trade secrets. The book notes that patents alone do not ensure wealth.

For most types of technological and business information, copyrighting, says the author, "is not the appropriate form of protection."

Pooley explains that when a company takes a trade secret claim to court, it must be able to describe the nature of the trade secret because: "Without a precise description, you cannot prepare an appropriate plan to protect it, or expect others to respect your rights."

The author then describes three steps that every company must take to protect its trade secrets. First, the firm must have a carefully developed and monitored program of protecting its proprietary information. Second, it must continually "seek to define its trade secrets." And last, but most critical: "It is appearances that count in court; you must make the judge or the jury believe you value your trade secrets as though they were the crown jewels."



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(continued from page 64)

graphics demo. A Graphics CP/M enhancement is also offered for more complex graphics programming, including three-dimensional forms. The graphics display resolution is comparable to the IBM Personal Computer's at 640 x 240 pixels.

Last and certainly least well-known is a system marketed by Bridge Computer in Newton, Mass., a division of Sea Data Corporation. It is included here primarily because of the feisty remarks of its developer, which seem appropriate to bring this article full circle. Winfield Hill, President of Bridge, had this to say about the state of the art in business graphics for personal computers: "In magazines you see a lot of what I call 'stupid graphics'—line graphs, pie charts, bar charts. People talk about color, but what they do with the color is trivial. They color pie charts, but I've never seen a pie chart used well at a meeting, and usually they occupy no more than 2 percent of the attention in the meeting. And to spend all this energy adding color and other things to the chart—well, that insults my intelligence."

Accordingly, Hill offers a system which does, he says, much more interesting things such as scientific and high-density plotting—not five to 10 variables but 100 variables—using a home-made software package called Plotpak. However, the complete configuration goes for some \$10,000.

Names conspicuous by their absence here, such as Tandy and Cromemco—and hardware manufacturers with beautiful graphics capabilities but not much software, such as Corvus—will doubtless be scrambling for the Fortune 500 business graphics dollar over the coming months. In the graphics world there will be single engine prop planes, Lear jets and mopeds that fly; if you ask a lot of questions first, you might be able to tell the difference before you climb aboard.

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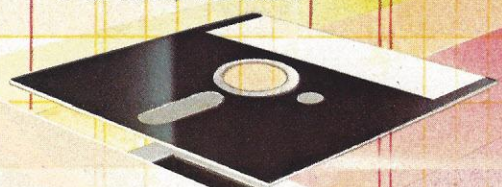
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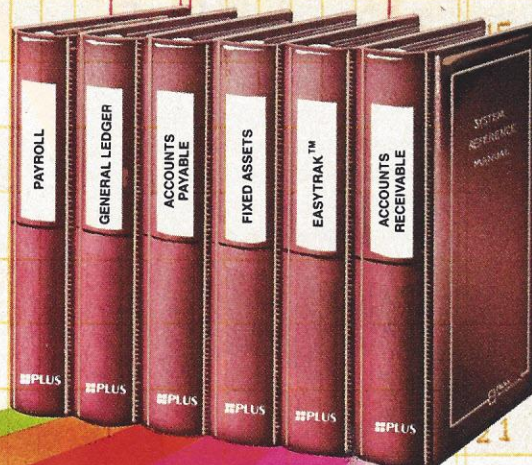
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OUTLOOK

NO HANDICAP

(continued from page 24)

track, keep pay records, and store information on the horses such as past performances."

The only wrinkle in Alexander's futuristic set up is compatibility with the newspapers' different computer systems. Steve Eyer, one of Trax Fax's key operators, explains that "each newspaper is set up with a different system. We have to adapt our program to their format."

Eventually, Alexander would like to write a custom program that would automatically change the format codes to accommodate each paper's system. A faster modem would also help speed up the process after each race.

"We're the first to computerize nationally," he says proudly. He expects all the tracks to switch over in the near future.

LITERARY STUDIES ENTER THE COMPUTER AGE

Fifty years ago, a literary scholar might have spent the better part of his career analyzing an author's style.



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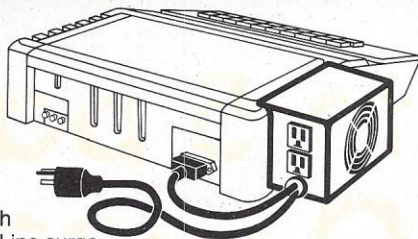
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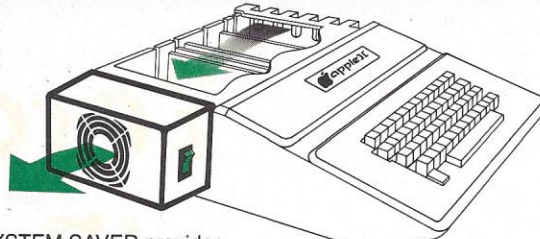
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Today, with the help of computers, such stylistic analyses can be completed in months.

The speed and ease with which computers can search through texts is a boon to literary studies, says Robert Dilligan, an associate professor of English at the University of Southern California. "A single line of poetry might contain 50 or 60 distinct features," Dilligan explains. "If you want to know if the features occur in particular patterns in a 1000-line poem, you may be dealing with 50,000 items."

A computer, though, can't assume the critical functions of a literary scholar. Nor can it "read" a text in the traditional sense. It acts more as a "research assistant/filing cabinet," Dilligan says. "It searches for patterns in which the scholar has a particular interest, and arranges and stores them."

The computer might, for example, identify the sound patterns of stresses and pauses. It might analyze grammatical structure and the arrangement of words to determine patterns of syntax. With such information, literary

scholars can trace a writer's influence on subsequent writers, identify historical styles of language use, or verify the authorship of particular works.

"The computer hasn't settled the great controversy of whether Bacon wrote Shakespeare or Shakespeare wrote Bacon," Dilligan says. "But recent scholarship using the computer suggests that the first five books of the Bible, the Pentateuch, were written by one author, and that the Pauline Epistles were written by many authors."

In another project using the computer, all surviving Greek manuscripts written before the sixth century are being entered into a computer to produce an accurate historical dictionary of classical Greek. The dictionary will enable scholars to trace a Greek word or root through some 1200 years of usage to see how its meaning has changed.

"We already have a historical dictionary of Latin, but only 10 million words are contained in surviving Latin manuscripts," Dilligan says. "Without computers, compiling a dictionary from the quarter of a billion words in



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surviving Greek manuscripts would be an arduous task."

Computers will play an important long-term role in preserving and transmitting literary texts, Dilligan says. "Libraries are becoming increasingly electronic, so works are easily transmitted across space and time," he states. "As this trend proceeds, computers will be used by literary scholars as readily as they're used now by scientists and businessmen."

A FLIGHT OF FANCY

Andy Loveman's business is making boxes, pallets and furniture in Nashville, Tenn. But a few years back he was a navigator in the Air Force. He flew in C-97s and Douglas Loadmasters (C-124s). Though sinus problems have grounded him from flying the real thing, Loveman still flies regularly—with an Apple II Plus and a Flight Simulator from SubLOGIC in Champaign, Ill.

"It's fascinating that so many flight characteristics can be programmed into an out-the-window display. For

example, when the plane lands, the computer lets you know—it bounces or even crashes if you lose control. You can also see different landing fields. It's certainly a way of sharpening one's senses, and it can build an interest in flying," he says.

Although Loveman doesn't propose this as a substitute for flying instruction, he sees it as a good preparation for it. He admires the three-dimensionality of the simulation and its realistic use of aircraft instrumentation on the screen.

"When you fly an airplane you have several controls to handle at the same time. The program includes rudder control, turn and bank," Loveman says. "When you turn, the Apple airplane descends and picks up a little speed, just as a real airplane would." But the system lacks trim or wind adjustments. The trim tabs on an airplane's control surfaces compensate for wind and other factors to make the controls neutral. Otherwise the pilot would have to compensate constantly, as a driver would with a car that pulls strongly to one side.

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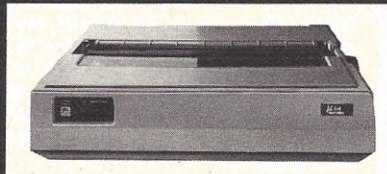
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OUTLOOK

With Flight Simulator, Loveman hones his eye/hand/mind coordination. Thus, it has an advantage over arcade games because it realistically parallels real-world activity; it becomes less of an escape from the world than a far-reaching exploration of it. And Loveman has an itch to fly which circumstances prevent him from doing. The program lets him simulate the flying experience. He can push the throttle forward, get his craft down the runway, and he can feel when the wheels stop bouncing along the tarmac and his prop pulls him right into the sky.

CONGRESSIONAL BILL TO BRING COMPUTERS INTO THE HOME

Congressman Newt Gingrich (R-Ga.) recently introduced the Family Opportunity Act, which will develop family work and educational centers in the home through the use of personal computers. The act will offer a \$100 per year, per family member, tax credit for up to 50 percent of the cost of a personal-computer system, with five years to write off the investment. With this bill, a family of four could buy a \$4000 system, and over a five-year period, take \$2000 in tax credits.

According to the congressman, the American family faces new opportunities to work and learn at home in ways that will strengthen neighborhoods and allow working mothers with preschool children to earn a living at home. "I want every American to have access to the same opportunities that computers provide for General Electric and AT&T," he says. "That's why working Americans should have the same kinds of tax breaks corporations automatically receive."

Gingrich's bill was influenced by the ideas of Alvin Toffler, author of *Future Shock* and *The Third Wave*. Toffler says that cottage industries will grow up, and will provide opportunities for many people to work at home. Because of personal computers, says Toffler, home education will also take an upswing.

“By increasing the number of folks working in their homes, we reduce the amount of imported oil needed now to commute to work,” Gingrich says. “At the same time, we’ll be training our young people for the highly technical jobs of their future.”

PERSONAL SPOOLING

Personal-computing users will be glad to know that there's a class of peripherals becoming available for the small machines that, until fairly recently, wasn't available except on minicomputers. It's a buffer that allows spooled printing. Spoolers come in several versions, but they can all really speed up any operation that involves high-volume printing.

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OUTLOOK

printer prints, the faster the data are transferred from the CPU to the printer.

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The spooler (buffer) then takes over. It tells the printer that there are data to be printed, and makes the machine think it's talking to the CPU. It handles all the hand-shaking required to accomplish the print task without bothering the CPU.

So all the parties involved are satisfied—the CPU, which thinks the print task is over very quickly; the buffer, which has something to do; the printer, which thinks it's still talking to the CPU the way it always did; and you, who get to do two things at once.

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(continued on page 161)

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OUTLOOK

(continued from page 158)

ANOTHER COMPUTER FEAT: THE BIBLE ON DISKETTES

As far back as the winter of 1979, John Holmes has been trying to use his Apple II personal computer to help him with bible study and Sunday school teaching. As the owner of Business Records Inc. (Charlotte, N.C.), a commercial records storage firm, Holmes was involved in several ambitious projects. But his undertakings never quite got off the ground, due in part to the enormous tasks involved.

Then, a few months ago, Holmes saw an ad for The Word Processor and wanted to know more about it. What he found was a program containing the entire King James Bible and Concordance. He then sent to Bible Research Systems in Austin, Texas, and received eight diskettes, recorded on both sides. He first backed it up on 16 one-sided diskettes, and then worked through the documentation, which he says is extremely well-written and takes about an hour to cover.

He soon discovered that the program could not only search through the entire Bible for any specific words or phrases, but could print out both the references and/or the appropriate verses. "If a Sunday school teacher is working on a certain subject, he can print out the verse references for his students to look up, then do a copy for himself that has the verses as well," Holmes says. A search takes about 16 minutes and can be saved for future reference, allowing the user to build his own index. The searches can cover the whole Bible or any portion of it.

Holmes feels this is not only faster than a concordance, but it uses computer power, which gives him much more flexibility. It also lets him find where the Bible uses a word in an unexpected way. Holmes cautions, though, that you must do a lot of disk swapping between the various program and index diskettes. And while the program will work with one disk drive, two are preferable. It requires a 48k Apple II or a TRS-80 Microcomputer Model III.

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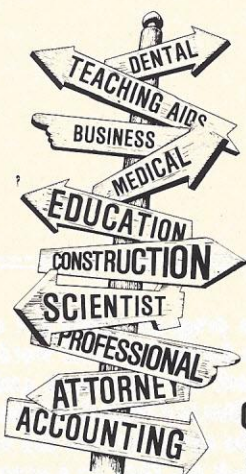
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CIRCLE 140

OUTLOOK

Giving one example of the program's use, Holmes says, "I had a big discussion on rewards with my Sunday school class, and I had used the program to print out all the reward references. The lesson became a lot more meaningful to my students when they could see what the Bible actually says."

Much work has been done in recent years to make the Bible more accessible. The main result of this effort has been revisions of the prose itself, like the Good News version. What Holmes found is yet another way to go about it—to take the traditional King James version and make its contents much more accessible for study.

INDEPENDENCE FOR THE PHYSICALLY IMPAIRED

Jack Kishpaugh's dream is to provide training in computer programming and word processing for severely mobility-impaired individuals, which will give them the chance to develop employment skills. He was the brains behind the National Paraplegia Foundation's (NPF) entry in the Johns Hopkins Personal Computing to Aid the Handicapped contest.

Called the "Mobile Computer Skills Evaluation Unit," the entry was designed to demonstrate to employers and mobility-impaired people their potential for mutual benefit. The unit includes a computer and peripherals, and will be used to identify and evaluate potential trainees' skills and aptitudes for computer programming and operation. When qualified individuals are identified, the unit will be used for training and developing their skills.

A quadriplegic for the past 10 years, Kishpaugh is intimately familiar with the physical limitations of the severely handicapped. He also has first-hand knowledge of the real need to be productive and as self-sufficient as possible.

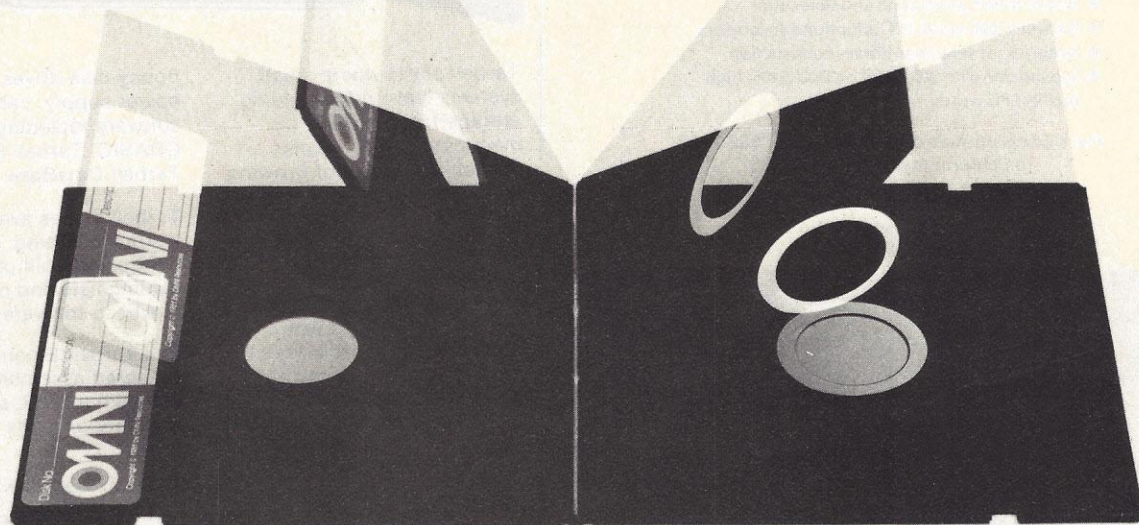
With the ever-increasing need for more people with computer skills, the handicapped are an untapped resource. Once trained, they could work from their homes, linked to the office through computer terminals and modems. The employer saves office costs (10 to 20 cents per square foot per employee) and is provided with an employee who can work at odd hours when there is not a heavy demand on the mainframe and data bank. This maximizes the use of capital investment. The at-home worker saves on the cost of transportation, wardrobe, cosmetics and food.

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(continued on page 166)

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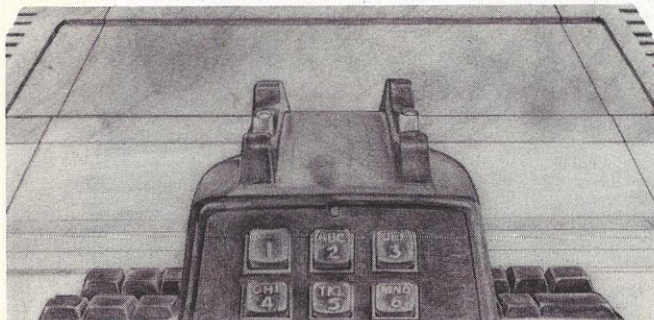
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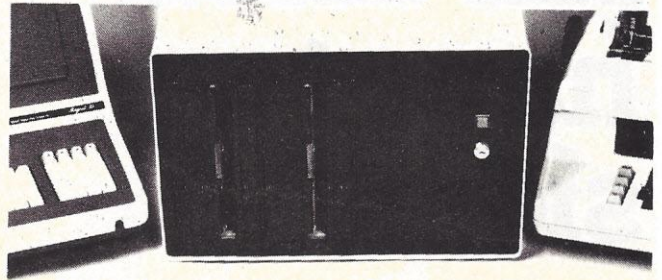
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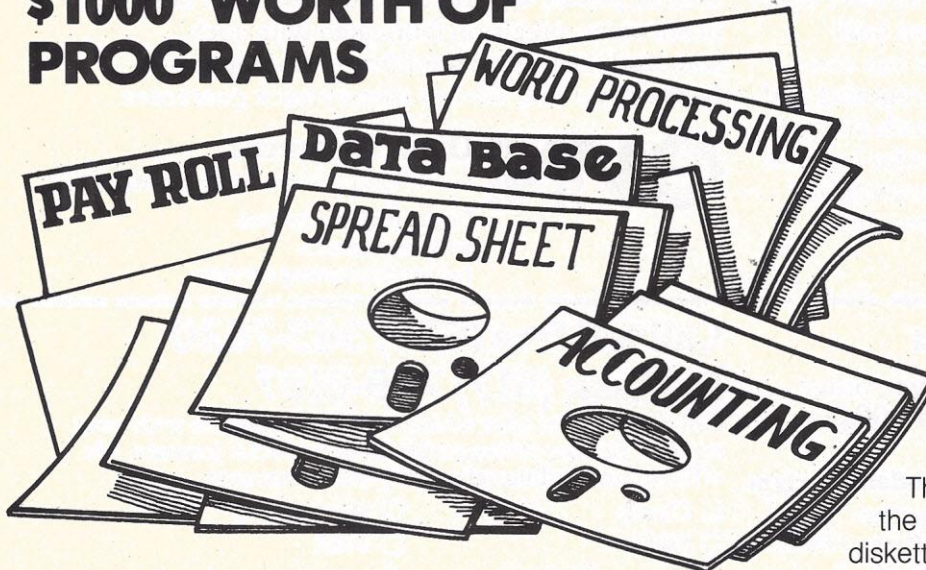
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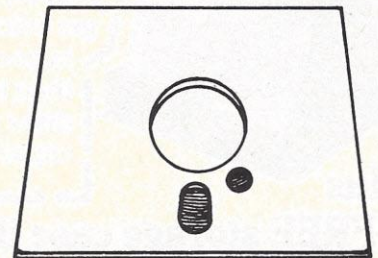
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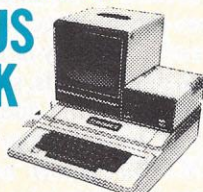
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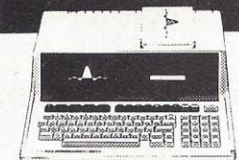
The 72 key keyboard includes an alpha lock key which simplifies operation with existing Apple software. The numeric pad cluster includes special keys such as period, plus, minus, greater than (go to) and asterisk (multiply) that are used frequently with VisiCalc.

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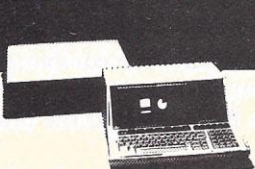


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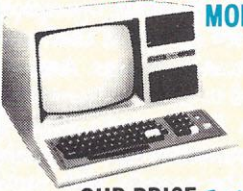
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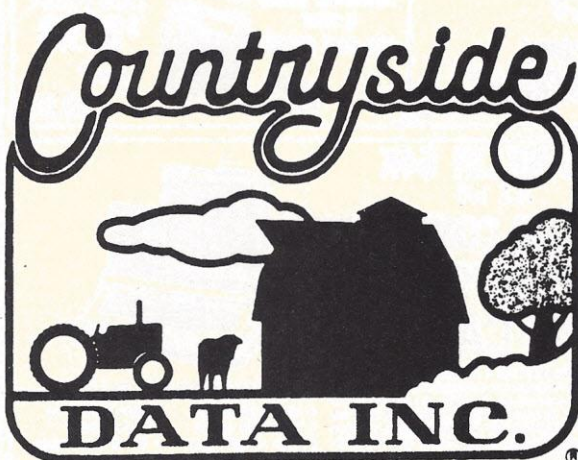
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OUTLOOK

INDEPENDENCE

(continued from page 162)

operator, programmer or word-processor operator. All of the required hardware and software, on loan from NPF, will be placed in the person's home.

Because of Kishpaugh's physical limitations, he has learned to set priorities and make the best use of his time. And his enthusiasm infected a lot of people.

Thus, the NPF entry into the Johns Hopkins' contest became a community endeavor. It depended—and the on-going project will continue to depend—upon the skills and generosity of many different resources. NPF receives no public funds, so the project was funded through private donations and dues. The computer equipment, a TI 99/4, was loaned from Texas Instruments, and the Epson MX-80 printer and Universal Data Systems' 103JLP modem were also loaned.



Jack Kishpaugh is a leader in the National Paraplegia Foundation's program to provide personal computers to the handicapped.

The organization wanted to modify the equipment for the most severely mobility-impaired individuals, which made Kishpaugh not only the brains behind the project, but also the first guinea pig.

"If we can prove that those least likely to be able to work can work, then helping all the other types of disabled people becomes less of a challenge," Kishpaugh says.

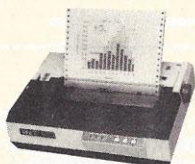
Although Kishpaugh had some difficulty operating the machines at first, of the various computer systems evaluated, there were none that could not be made operational. Longer mouthsticks, for those with no use of their arms, can perform any of the required manipulations. And some systems have obvious advantages to a severely mobility-impaired individual. The Texas Instruments 99/4 was selected because its solid-state modules can be inserted and removed from the front of the console with considerable ease. Installation of special switching was achieved without knowledge of electronics. Only in the shift-lock

(continued on page 173)

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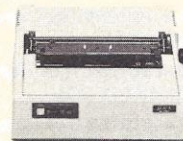
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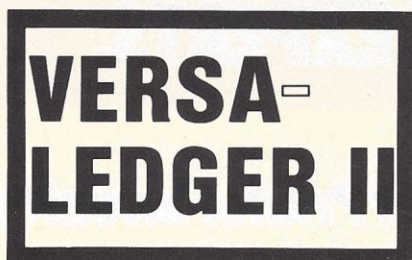
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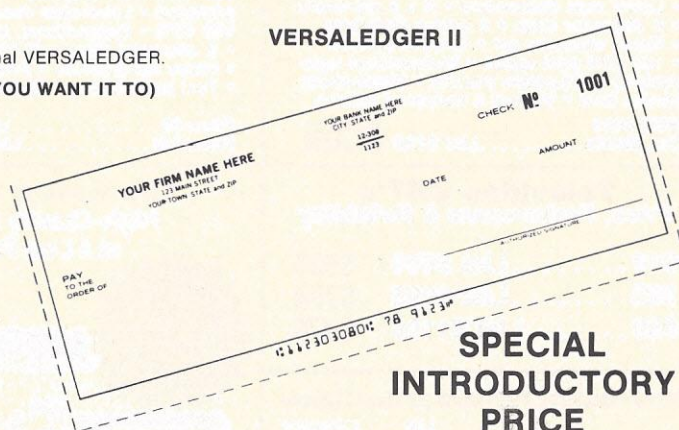
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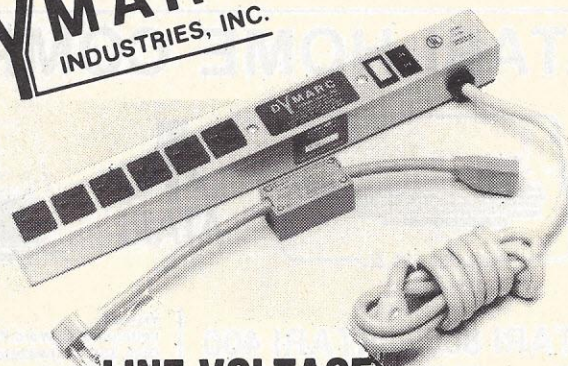
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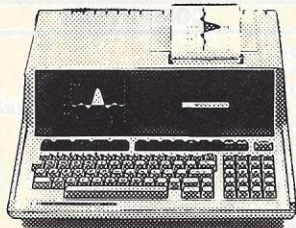
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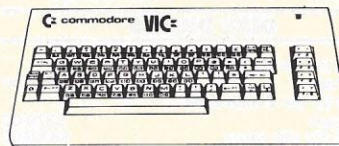
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OUTLOOK

INDEPENDENCE

(continued from page 166)

toggle switch was it necessary to use electronic expertise to identify proper lead placement within the computer.

To insert a disk into a disk drive requires finger dexterity, a luxury that a quadriplegic does not have. A crude plastic ramp was fashioned from an empty plastic disk box and attached with a few rivets and some crazy glue. This made it possible to slide a disk into the drive with a mouthstick or orthotic device.

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Four individuals, selected by NPF, have started their training. The program will be monitored closely to work out any bugs before it is expanded.

This article was prepared by Donna Bearden, vice president of the Young People's LOGO Association.

COMPUTING IN THE WILD BLUE YONDER

by Dale Archibald

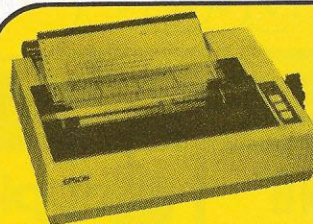
As personal computers make their way into the briefcases of America, it won't be too long before they will find their niche in the skies. After all, if you have to fly somewhere for a business meeting, why not get some work done in the airplane's uninterrupted silence? But there is a catch: The airline might not let you use your computer during the flight.

Airlines are naturally conservative, which is one reason for their great safety record. The flight crew, responsible for everyone's safety on board, may refuse to let you use a computer because its internal clock could interfere with the airplane's navigation system.

The regulation that covers these little machines is Federal Aviation Regulation 91.19, in a section on portable electronic devices. Paragraph A of this regulation says that except for a few exclusions, "No person may operate, nor may any operator or pilot in command of an aircraft allow the operation of, any portable electronic device." Any air carrier or commercial aircraft, or any plane operating under instrument flight rules (IFR), is bound by this regulation.

Paragraph B lists the portable electronic devices that can be used aboard an airplane. These include portable voice recorders, hearing aids, heart pacemakers and electric shavers. After extensive testing, calculators have also been pronounced safe for use aboard most airlines. The list of exclusions further includes "any other portable electronic device that the operator of the aircraft has determined will not cause interference with the navigation or communication system of the aircraft on which it is to be used."

Bill Osmun, a technical expert for the Air Transport



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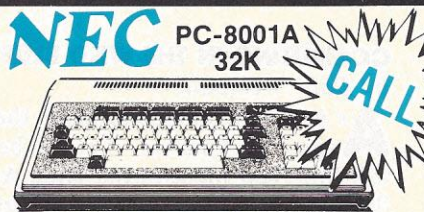
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AND IN THIS CORNER. . .

by John A. Borden

The competition is on and the prize is supremacy in the personal-computer retail market. On one side are the Computerlands, Radio Shacks and Byte Shops, seemingly confident of their position in the market. In the other corner are the challengers, the mass merchandisers—department stores and consumer electronics stores with odd names like Crazy Eddie's—who figure the time has come to start offering personal computers in their stores.

Nowhere is this competition more obvious than in the metropolitan New York City area, where two consumer-electronics store chains and two department store chains are now building up their personal-computer de-

partments, usually alongside their video games.

Spokesmen for Macy's and Bamberger's, the two large department store chains, say they want to broaden their customer's choices by offering Atari and Commodore lines now and considering IBM and Apple products for later in the year. Sam Goody and Crazy Eddie, whose stores represent 40 consumer-electronic outlets in the Manhattan area, plan to stock the Commodore VIC 20 and are considering some Atari and Texas Instruments lines, according to Nancy Beckmann of Roth-Paris Marketing, a representative of the Commodore lines of personal computers.

One way to widen the computer frontier, some mass merchandisers have found, is to put on a show. The Bamberger's department store in Menlo Park, N.J., recently staged a six-day exhibition, and as a result, garnered over \$22,000 in sales. Representatives from Atari, Texas Instruments and Commodore were there to demonstrate their products and to answer questions. The audience was shown a line-drawing demonstration and a phone hookup

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OUTLOOK

with Dow Jones, a news retrieval service, providing a printout and analysis of stock market activities. Bamberger's thought so much of the show that it plans to hold another at its Paramus, N.J., store.

Stanley Gerasimczyk, assistant buyer of video games at Macy's, reports that customer demand and interest has grown so significantly that expansion of their product lines was necessary. "We want to carry a good mix here. Atari is geared to entertainment," he says, "while the IBMs and Apples will be for the customer who is interested in business applications."

Only the Macy's on 34th Street (Herald Square) in New York will feature a computer center, says Gerasimczyk, "because the interest level in the suburbs is still geared mostly toward entertainment. We've tried acquainting all of our salespeople in the electronics and video department here with computers, but it hasn't worked out. A television salesman in Herald Square isn't interested in selling computers," he says. "Our people are paid on a commission basis, and they are not interested in

selling something that doesn't offer a commission."

But other salespersons at other establishments, such as the scores of camera and hi-fi shops near Penn Station in New York are taking the new machines in stride.

Bob Borger, who uses an Apple II to operate his two hi-fi stores, recently had Beckmann demonstrate the VIC 20. He believes he could do a good personal-computer business even though Borger's isn't known as a computer center. "Most people who come in are interested in the games applications, but I believe many of them are interested in the educational aspect, too," he says.

Jeff Cohen, a salesman at Madison Camera in Manhattan, says, "People will buy a computer because they've read about it and heard about it." Madison Camera has sold over 30 Commodore VIC 20s from last Christmas to this March, so the shop has ordered some Atari lines and is considering some Apple and PET lines.

But despite the rising competitive challenge from small stores and mass merchandisers, the lion's share of the computer market may well stay with the computer cen-

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OUTLOOK

ters and similar operations. "They feel that if they start you off, you'll stay with them," says Beckmann, "and they feel they have a definite advantage since their people sell computers full time."

ACCOUNTANTS CONVERT TO COMPUTERS

The Microcomputer Assistance Service, designed to solve most of the problems business owners face when converting their accounting records to personal-computer software, was recently initiated by Seidman & Seidman, a national accounting firm. A special staff of CPAs and computer accounting specialists are available to help businesses with the conversion task.

The service includes Conversion Studies, which will help determine the best hardware/software combination for the buyer's business; Installation Assistance, which will help transfer manual accounting systems onto personal-computer software; and Problem Solving, which determines why systems don't meet expectations.

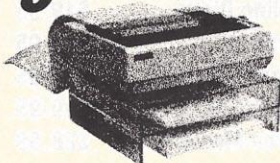
"Owners of smaller, faster-growing companies, who could benefit most from personal computers, are often unable to get their systems on line," says B.Z. Lee, managing partner of Seidman & Seidman. "There is a lack of skilled experts, either in-house or at the dealer level, who can translate a company's manual accounting records onto the software systems which lie at the heart of personal computers. The computers now offer small-business owners the speed and accuracy of automated record-keeping, as well as long-range planning at a relatively low cost."

Robert O. Redd, a Seidman & Seidman partner and the coordinator of Microcomputer Services, says that for more than 10 years the firm has been committed to developing an expertise in computers, "beginning with mainframes, progressing to minicomputers, and now converting our offices to personal computers." He says the data processing capability has been used to provide extensive bookkeeping and accounting functions for clients who do not employ in-house accounting personnel.

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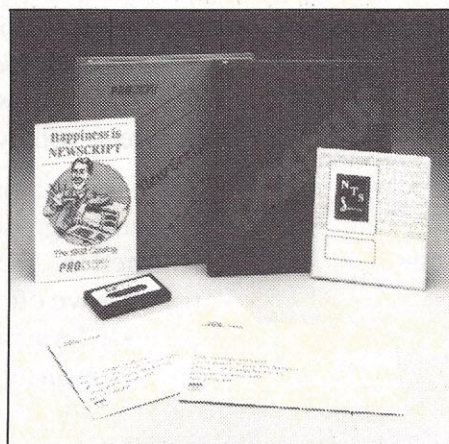
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CIRCLE 89

HARDWARE OF THE MONTH

HP, NECIS Launch New Systems

AS PRICES GO LOWER. . .

New software for accounting, data-base management, tax planning and word processing is now available for the new modularly designed HP-86, the lowest-priced personal computer ever offered by Hewlett-Packard at \$1795. The software complements HP's existing graphics, electronic worksheet and data-communication programs.

"Our 'core' software solutions, plus the new offerings, will make the HP-86 more attractive to professionals in business and the office environment, as well as to our traditional base of engineering and science professionals," says Daniel Terpack, general manager of HP's Personal Computer Division.

On the hardware level, the HP-86 consists of a micro-processor and a keyboard in one package. The keyboard features alpha and numeric pads, and 14 user-definable special-function keys. Four ports in the back of the computer allow for power expansion. The HP 82900 CP/M system, the HP 82950 modem, HP memory modules and additional ROMs can all be plugged into the ports.

Dedicated interfaces connect the computer to display monitors and one or two disk drives. The HP 82912 (9-inch diagonal) and HP 82913 (12-inch diagonal) monitors display text in an 80-column by 24-line format. In addition, the monitors display graphics. List prices of the 9- and 12-inch monitors are \$295 and \$325, respectively.

The HP 9130 flexible disk drive features 270k capacity and uses double-sided, double-density disks. The recommended list price of the new disk drive is \$850.

The HP 82905B dot-matrix impact printer, with compressed and expanded type and a variety of print formatting options, is expected to be most popular with the new HP-86. However, several other printers for personal

computers are available from HP. The recommended list price for the impact printer is \$795.

In terms of software, HP has custom-written programs for the HP-86, in addition to its new releases, and many of these packages are available in CP/M mode. These custom programs include general ledger, accounts receivable and accounts payable, which make up a complete solution for many professionals who need small-business accounting. In addition, Peachtree Software's inventory-control and PeachPay Payroll System packages for the HP-86 will be available in late summer and early fall. All accounting programs carry a suggested list price of about \$750 each.

Data-base management on the HP-86 is accomplished using Ashton-Tate's dBASE II software, which runs under CP/M and features relational data-base management. It is available for \$650. Also available under CP/M are three tax-planning software packages for personal, professional and estate tax planning. These packages, written by CPAs, are supplied by Aardvark Software.

Other CP/M solutions that run on the HP-86 include WordStar, a word-processing package; SpellStar, a spelling-checker program; and MailMerge, a mail-list manager. All are offered by MicroPro International. Moreover, Milestone software, a project-tracking program, lets professionals control time and money constraints when managing projects. Milestone is offered by Software Digital Marketing.

In addition, two data-communications software solutions let the HP-86 communicate with other computers and with information services such as The Source, the Dow Jones News/Retrieval Service and CompuServe. HP-86 data communications can be accomplished over phone lines with the HP 82950 modem, or "hard-wired" with HP's Data Communications Pac and an HP serial interface. A free hour of connect time on Dow Jones and The Source comes with the purchase of the HP modem or Data Comm Pac, giving the new user an introduction to information services.

FOR MORE INFORMATION: Inquiries Manager, HEWLETT-PACKARD CO., 1820 Embarcadero Rd., Palo Alto, CA 94303.

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HARDWARE OF THE MONTH

expansive disk capacity and comprehensive application software, and at an attractive price level," says Richard M. Underwood, president of NEC Information Systems.

The Advanced Personal Computer is aimed at businesses of all sizes. "In smaller and larger companies, our APC can be used for a variety of applications, including planning, analysis, data-base management and word processing," says Harland K. LaVigne, vice president of systems marketing. "In addition, the communications capabilities that the APC offers means that it can also be used for electronic mail and as a terminal to access a company's larger computers."

The APC is built around an NEC-manufactured, 16-bit 8086-compatible microprocessor. It is packaged in a compact, integrated enclosure with a detachable keyboard. The computer comes in two basic models, color and monochrome, and both models incorporate 12-inch (diagonal) monitors and display 25 lines of 80 characters, plus a system status line.

The monochrome model, priced at \$3298, combines a

green/black high-resolution monitor, 128k of user memory, a keyboard and a single NEC-manufactured 1M byte, dual-sided 8-inch floppy disk drive that can be upgraded to a second diskette. The color model, which includes two disk drives, is priced at \$4998. It is functionally identical to the monochrome, but its high-resolution monitor displays eight colors.

The APC also provides multifaceted screen display capability. Characters are formed from high-resolution 8-by-19 dot matrices. Symbols can be selected from either of two character sets, one of which has more than 200 predefined symbols. The second, larger set can be defined on a dot-by-dot basis by the user. Since the user-defined set can be redefined or reloaded from disk at any time, the APC can have an arbitrarily large character set that can be tailored to applications ranging from meteorology to word processing in languages that use non-Roman alphabets.

To facilitate new-user learning, the APC keyboard has been made compatible with standard office typewriters. It

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HARDWARE OF THE MONTH

includes 22 dual-mode, user-definable function keys, providing 44 optional ways in which to simplify system and application program use. A numeric keypad and a full set of cursor control keys are standard.

Standard I/O equipment includes a parallel printer controller and a serial communications controller that supports both asynchronous and synchronous communications at up to 19,200 bps.

The computer also offers many optional features that can be used with both the monochrome and color models, and it can be maximally configured with all options simultaneously. For example, there is no need to reduce memory capacity to accommodate other optional features.

The APC supports both a 100-cps, 136-column dot-matrix printer (\$695) and the NEC Spinwriter letter-quality printers. The dot-matrix unit prints not only the entire standard APC character set, but also all graphic symbols defined by the user.

The graphic resolution of the optional graphics sub-

system is 1024 by 1024 pixels. A movable 640 (horizontal) by 475 (vertical) pixel "window" can be displayed. Graphics memory is totally independent of character display memory; the two are combined before being sent to the screen. The graphics hardware, which directly displays lines, arcs and circles, is fully supported by both operating systems offered with the APC. Thus, it can be accessed in any programming language supported by the operating system.

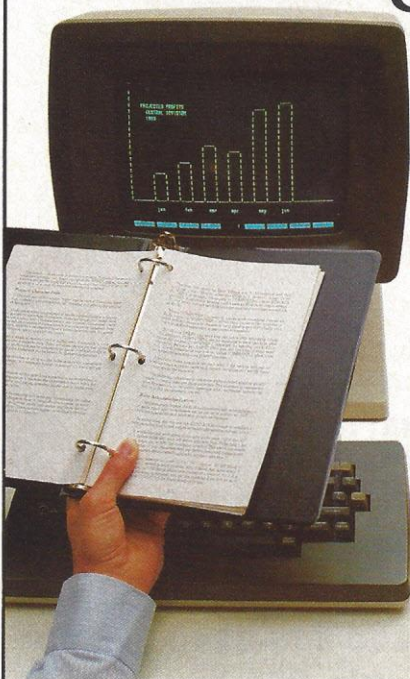
NECIS will initially license and offer support for nearly 20 general purpose or "horizontal" application software packages. All NECIS-marketed software comes with a written agreement that states: Every program must conform to the specifications supplied with it, or the company will arrange for the license fee refund within 30 days of acquisition, if it cannot bring the program into compliance. Computer repair, both in and out of warranty, is handled by authorized APC dealers.

FOR MORE INFORMATION: NEC INFORMATION SYSTEMS INC., 5 Militia Dr., Lexington, MA 02173; (617) 862-3120.



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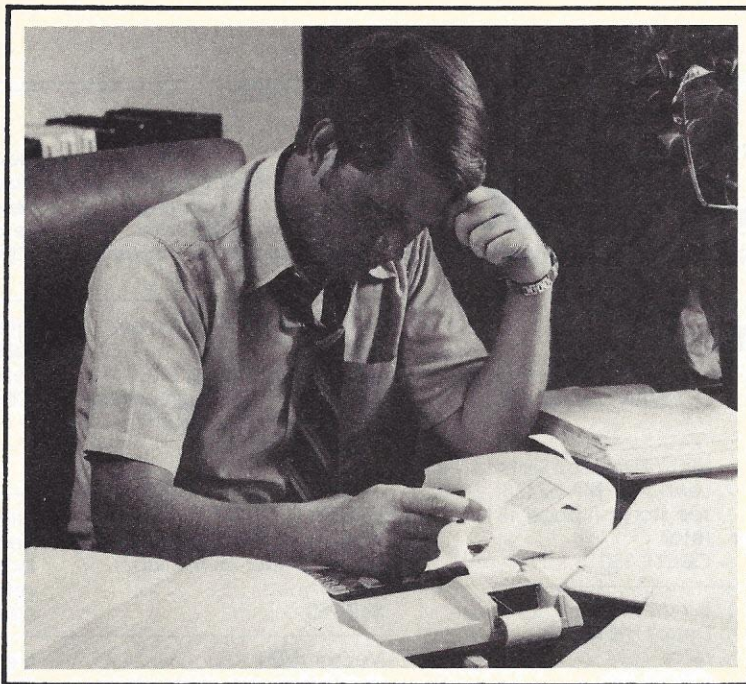
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HARDWARE INDEX

HARDWARE INDEX

A COMPREHENSIVE LISTING OF NEW PRODUCTS

SYSTEMS

PRODUCTS/FEATURES/PRICE

COMPANY/AVAILABILITY

Advanced Personal Computer (APC) based on a 16-bit 8086-compatible microprocessor from \$3298

NEC Information Systems, Inc. Lexington, MA 02173 see story on page 181 retail CIRCLE 330

B20 can be used for stand-alone applications and as part of distributed processing networks from \$5000

Burroughs Corp. Detroit, MI 48232 retail CIRCLE 331

HP-86 modularly designed system with software for accounting, data-base management, tax planning and word processing \$1795

Hewlett-Packard Co. Palo Alto, CA 94304 see story on page 181 retail CIRCLE 332

iPDS Personal Development System aimed at improving the productivity of design engineers and shortening product development time \$4495

Intel Corp. Hillsboro, OR 97201 retail CIRCLE 333

IST 86 16-bit system that addresses up to 1M of error-correcting memory \$12,950

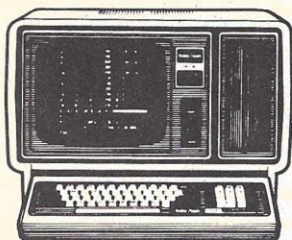
Interactive Systems Technology Indianapolis, IN 46220 retail CIRCLE 334

Vector 4/20 dual floppy disk drive system with 630k capacity

Vector Graphic Thousand Oaks, CA 91320 retail

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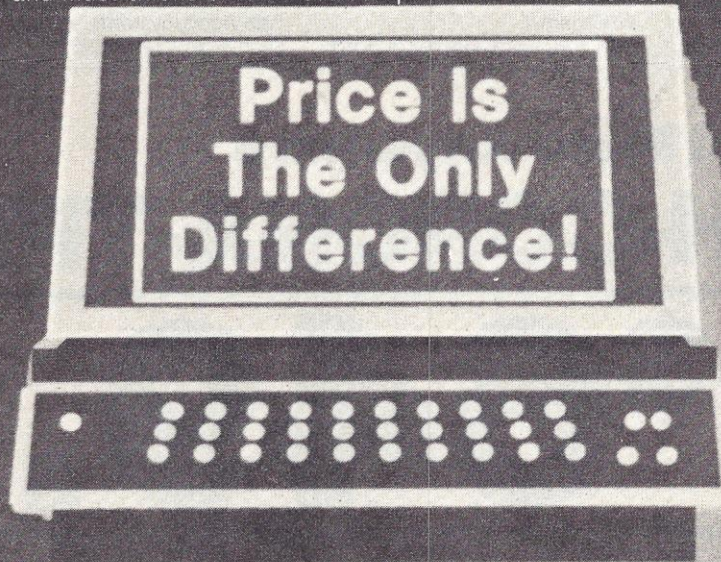
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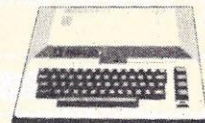


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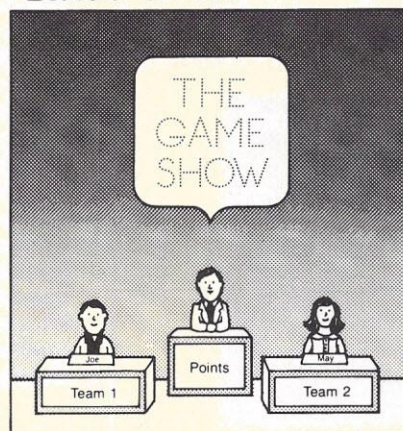
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BASIC BEGINNINGS

Basic APPLE BASIC

#5626

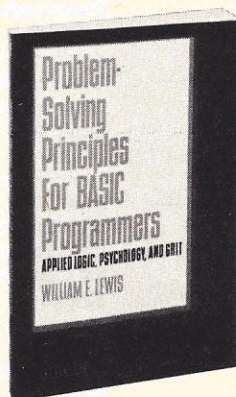
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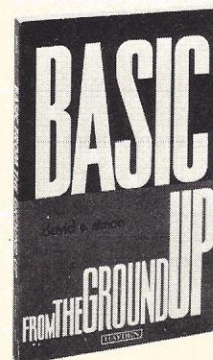
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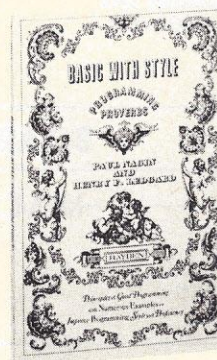
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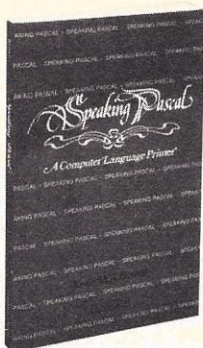
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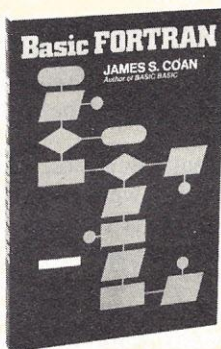
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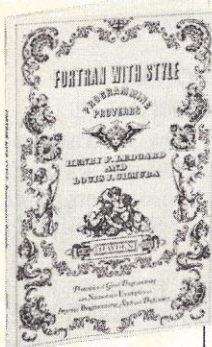
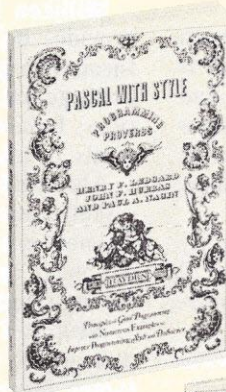
Basic FORTRAN

(Coan) Enables the novice programmer to write meaningful FORTRAN programs immediately. The author takes you step by step through the programming process, beginning with short, complete programs which are then developed into longer, more comprehensive ones. \$9.95

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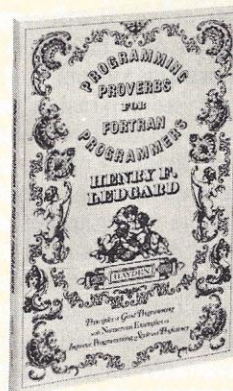
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NEW OPERATING SYSTEM FOR IBM PERSONAL COMPUTER

Phase One Systems of Oakland, Calif., has released Oasis-16, a multiuser operating system for the IBM Personal Computer. The system costs \$1495 and requires a 5M Winchester hard disk drive, 128k of RAM, a monochrome display adapter, and a 5¼-inch floppy-disk adapter with two drives. It will support up to 640k of RAM and Corvus or XComp hard disk drives.

The operating system will handle up to 32 users with the appropriate expansion peripheral products added. It provides for optional passwords and private, shared and public files. Printing can be done concurrently with other tasks. Automatic record and file locking guard against multiple users trying to get into the same memory space, which could destroy stored information.

In addition, the operating system's direct compatibility with regular Oasis-based software written in BASIC or C makes over 400 professionally prepared programs immediately available for the computer.

FOR MORE INFORMATION: PHASE ONE SYSTEMS, 7700 Edgewater Dr., Suite 830, Oakland, CA 94621; (415) 562-8085.

SOFTWARE FOR EDUCATION, PERSONAL ENRICHMENT AND ENTERTAINMENT FROM TI

Texas Instruments is providing 45 new educational, personal enrichment and entertainment software selections for use with the TI-99/4A Home Computer. Thirty of these packages are in TI's Solid State Software command module format.

Heading the list of new educational products are a number of interactive learning packages developed by TI in conjunction with educational publisher Scott Foresman. These include five new reading aid modules that contain both color graphics and optional synthetic speech, and each of which features a four-part learning skills program. The first three parts of each program consist of stories and accompanying drills. The fourth part incorporates all skills into a final story.

Another educational publisher, Addison-Wesley, has worked with TI to develop two math learning modules for use with the TI-99/4A Home Computer system. The first, Computer Math Games II, was designed with progressive levels of difficulty for grades one through nine. The second package, Computer Math Games IV, created for students in grades two through nine uses whole numbers, fractions, decimals and integers in four individual games with color graphics and sound.

The Scholastic Spelling series of four modules (Level 3, 4, 5 and 6), developed by TI and Scholastic Publishing Co. for use by children in grades three through six, requires TI's Speech Synthesizer. Each of the four separate modules—one for each grade—has text-to-speech capability using allophones, which allow the computer to pronounce words as recommended in the American Heritage Dictionary.

Milliken Math, a series of eight command modules, provides drill and practice for children in grades one through eight. Each of the eight modules—Addition, Subtraction, Multiplication, Division, Integers, Fractions, Decimals and Percents—has 75 different problem levels to allow for drill and practice.

Also available from TI, in educational learning aids on diskette instead of command module, are 11 math and science programs developed by the Minnesota Educational Computing Consortium (MECC) for grades one through eight.

New to TI's line of educational aids for both children and adults is Touch Typing Tutor, which provides six typing lessons, a diagnostic section featuring word-per-minute testing and practice areas.

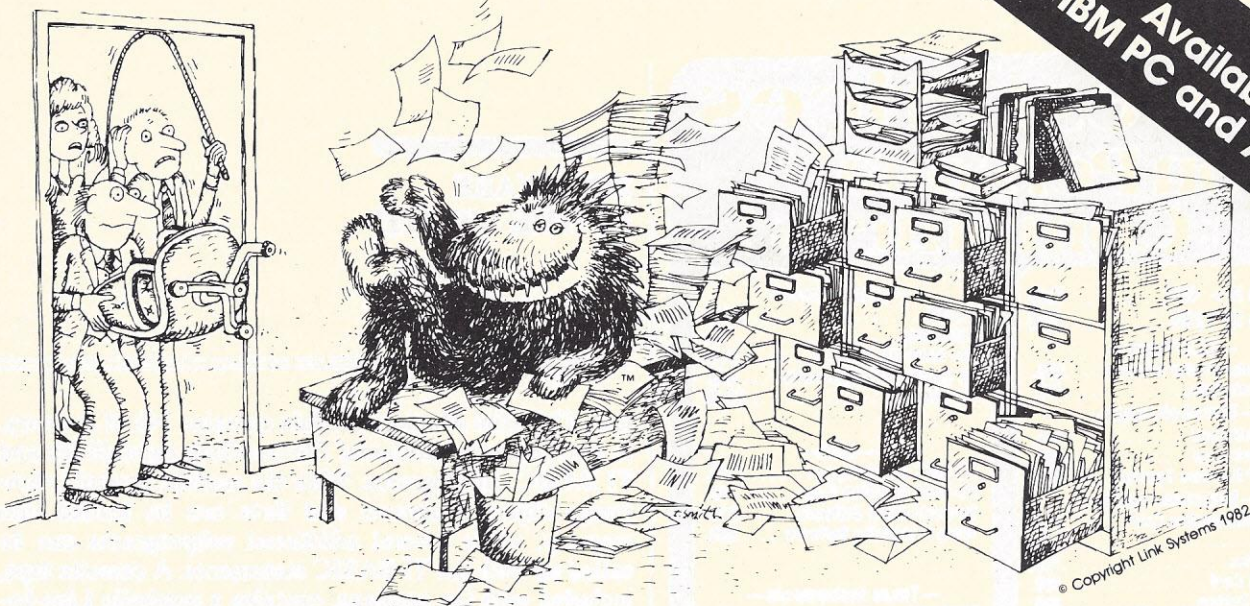
Also in the personal enrichment category is Personal Report Generator. By using files created with these command modules, users can create personalized letters, address labels, tables of results, a personal calendar and a personal telephone directory.

Another package, Basketball Statistics, was designed for high school or college coaches who wish to keep track of players' statistics. The package is available on diskette.

The Editor/Assembler package extends the flexibility of the TI-99/4 or TI-99/4A Home Computer by allowing users to program in TMS9900 assembly language. This gives direct access to all system features, such as sound, speech, graphics and I/O at the highest speed possible from the computer's 16-bit microprocessor. The Editor/Assembler package includes a Solid State Software command module and two floppy diskettes, plus an owner's manual that provides extensive documentation of the software's architecture.

The Mini Memory Solid State Software command module provides additional memory for the home computer, as well as important tools for program development. The module also contains a built-in battery, which permits the programs and data stored in the module's RAM to be retained when the computer console is turned off, even if the module is removed from the con-

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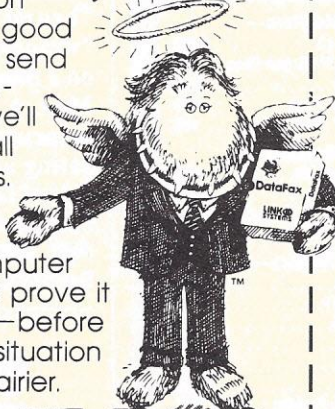
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SOFTWARE OF THE MONTH

sole. The Mini Memory module contains 14k of memory. It also features additional file-handling capabilities and TI BASIC subprograms. With the module, assembly language object programs and data can be loaded into memory, while several additional subprograms can be called up with the TI BASIC statements. A cassette tape, included with the package, contains a symbolic Line-by-Line Assembler and a graphics demonstration program.

The TI-Writer Solid State Software word-processing command module was designed to provide many of the features of larger, more complex word-processing systems to users of the home computer. Text editing and formatting features include inserting and deleting text and lines, automatic paragraph indentation, right margin justification, automatic word wrapping, overstriking and underlining, moving and copying text, and document formatting. Users can create, edit, save and print documents with the Text Editor Option in either word wrap or fixed mode—word wrap for documents in paragraph mode, fixed mode for charts and tables. Documents can be printed directly from the Text Editor option, or Text Formatting commands can be inserted into the document, stored on diskette, and printed through the Text Formatter Option. The price for this package is \$99.95.

TI is also expanding its entertainment library with new software games: Chisholm Trail, requiring the user to move a "steer" through a maze on the screen to kill four "brand" monsters and one special monster, the "wrangler"; Parsec, in which the user battles alien ships on a planet in outer space as they attack in waves; Munch Man, a one-player game in which the player must outmaneuver the Hoonos, trying to clear the game's maze by eating all the dots before being eaten himself; and Tunnels of Doom, a role-playing adventure that stimulates the imagination and challenges survival instincts.

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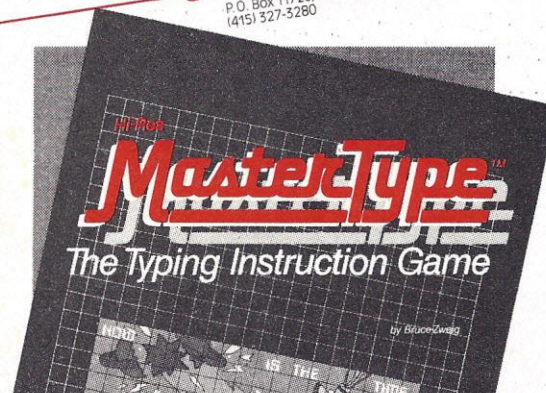
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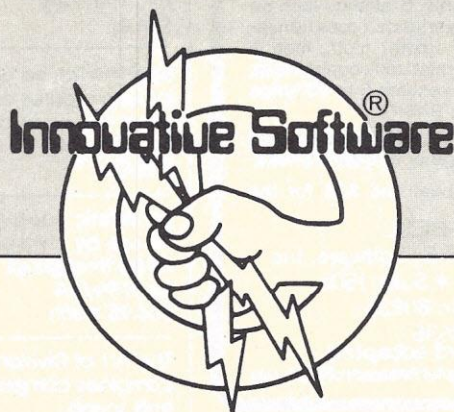
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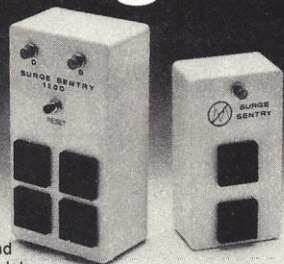
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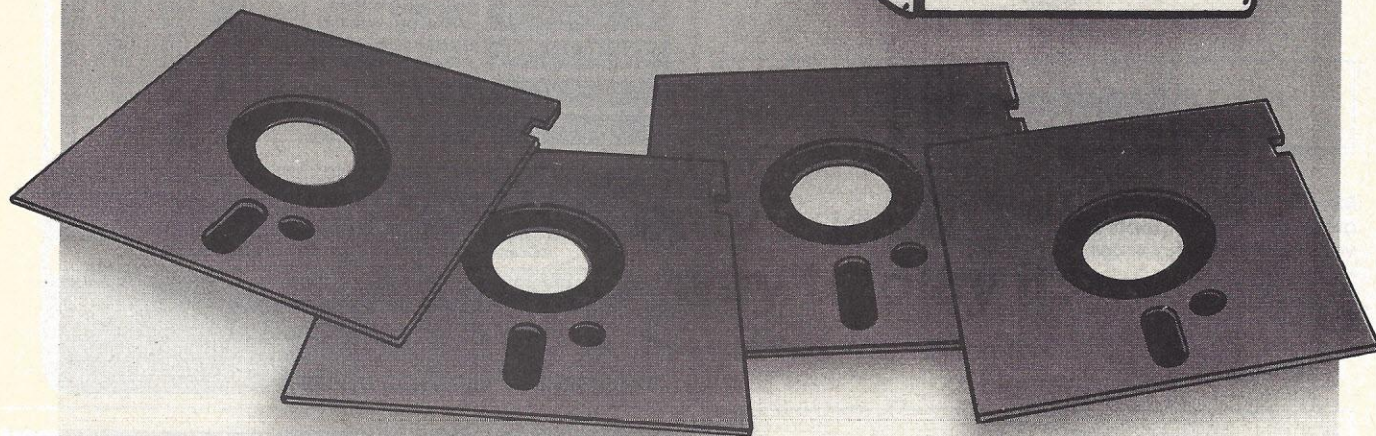
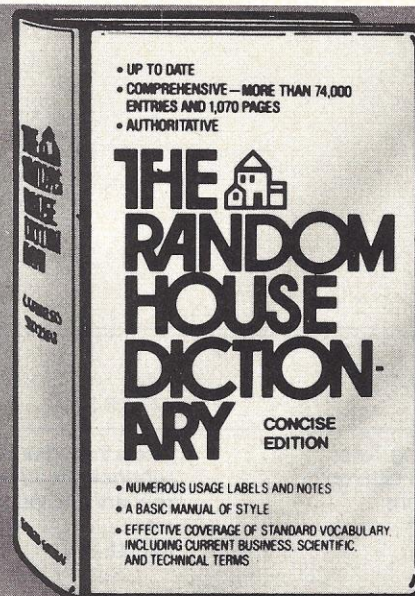
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High Technology/Wichita (316) 262-0315
Gosub Int'l Inc. (316) 265-9858
Book Nook (813) 482-8882
Computerland/Topeka (913) 267-6530
Computerland (913) 841-8611
Online Computer Centers (913) 341-6651
Personal Computer Ctr. (913) 649-5942
The Computer Room/Beatty (913) 341-3500

KENTUCKY
Computer Emporium (502) 589-9482
Heathkit Electr. (502) 245-7811
Computer Place (606) 276-3594

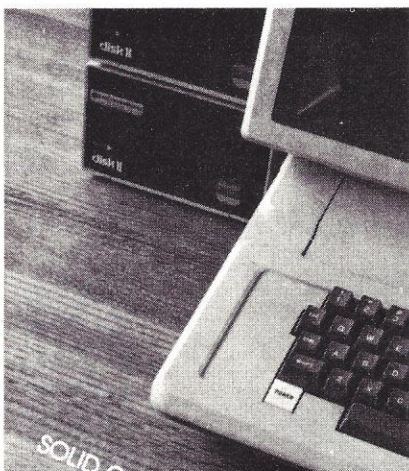
LOUISIANA
Computer Shoppe Inc. (504) 454-6600

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MARYLAND
Bethesda Computers (301) 657-1992
Chalfitz (301) 340-3300
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Komar Ltd. (301) 675-2200
Logical Choice (301) 465-3175
Micro Age (301) 762-5585
Basik Computer (301) 440-0412
Program Store/Baltimore (301) 944-0200
Radio Shack (301) 224-2900
The Comm. Center (301) 792-0600
Willis Computer Store (301) 423-4525

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Computer Source (413) 443-7181
Retail Computer Ctr. (413) 589-0106
Small Computer Data Sys. (413) 592-6600
Computer City (617) 755-5464
Computer City (617) 875-8126
Computer City (617) 273-3146
Computer City (617) 242-3350
Computer City (617) 862-9217
Computer City (617) 774-7118
Computerland/Boston (617) 235-6652
Computerland/Boston (617) 482-6033
Computer Store (617) 332-5470
Computer Store (617) 354-4599
Harvest Computer (617) 547-3289
Heathkit Elects. (617) 237-1510
Land of Electronics (617) 581-3133
New England Electronics CO (617) 449-1765
Ni-Ni's Corner, Inc. (617) 547-3558
Out of Town News (617) 354-7777
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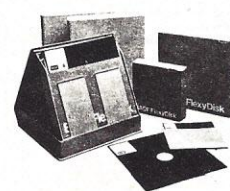
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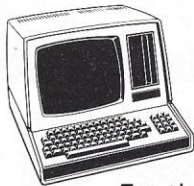
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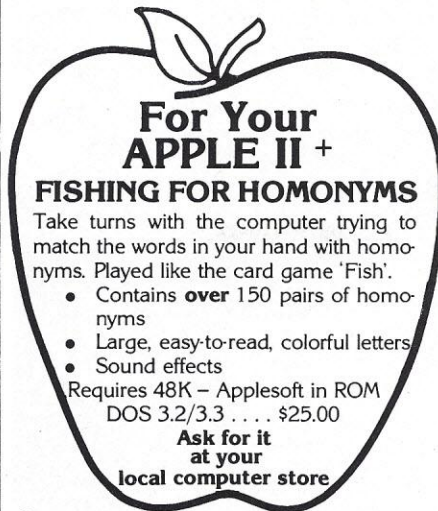
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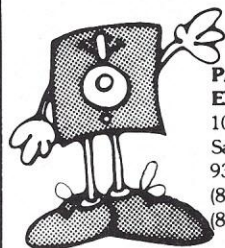
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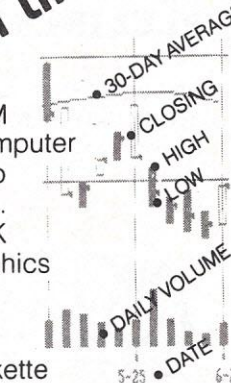
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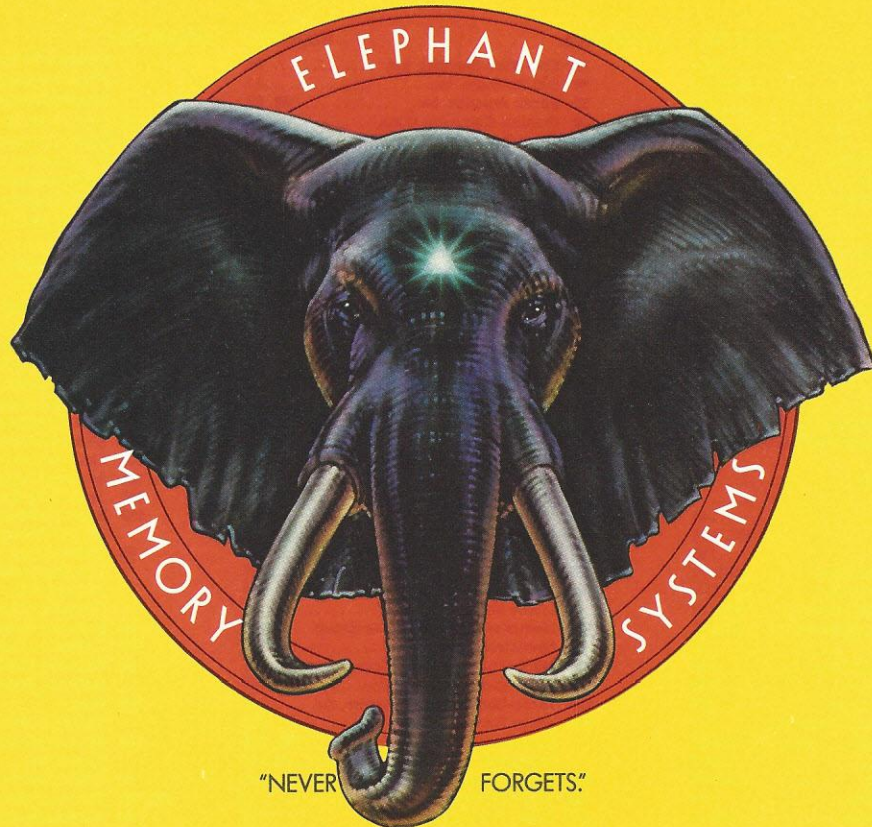
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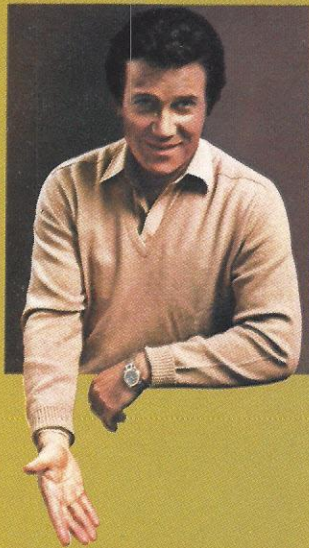
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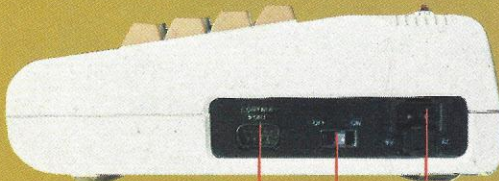
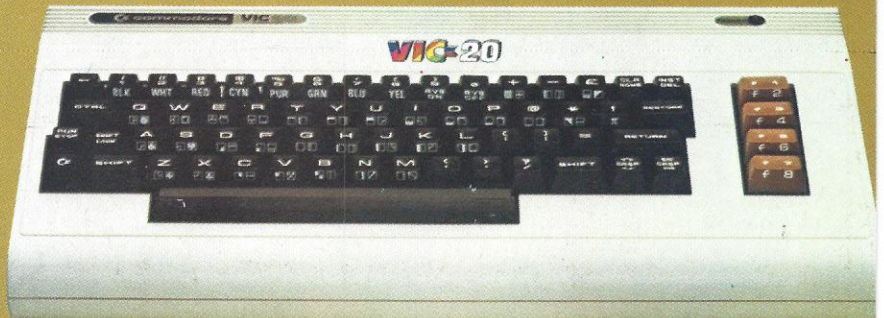


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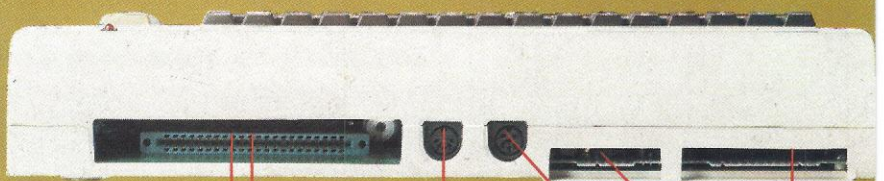
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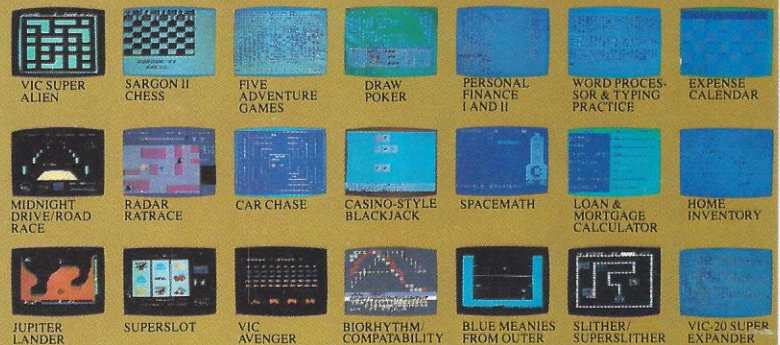


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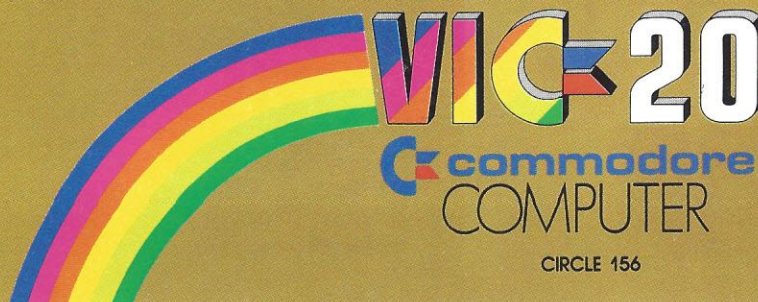
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